CECW-PC (1105-2-10a)

MEMORANDUM FOR CEMP-SWD (ATTN: Paul Blakey)

SUBJECT: Lower Colorado River Basin Phase I, TX (October 2006) – Documentation of Review Findings

1. This memorandum forwards the documentation of policy compliance review findings for the subject project proposal. In the opinion of the policy compliance review team, all policy review concerns have been adequately addressed for this phase of project formulation and development.

2. Office of Water Project Review consideration of subject feasibility report and environmental assessment is complete. Questions concerning the HQUSACE policy compliance review of this project proposal may be discussed with review manager, Thomas Hughes, at 202-761-5220.

Encl

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Policy and Policy Compliance Division
Directorate of Civil Works

DOCUMENTATION OF REVIEW FINDINGS

Lower Colorado River Basin
Phase I

FLOOD DAMAGE REDUCTION
&
ECOSYTEM RESTORATION

FEASIBILITY REPORT
AND
ENVIRONMENTAL ASSESSMENT

December 2006

ENCLOSURE

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DOCUMENTATION OF REVIEW FINDINGS

LOWER COLORADO RIVER BASIN PHASE I

FEASIBILITY REPORT
AND
ENVIRONMENTAL ASSESSMENT
AUGUST 2006

A. GENERAL.

1. Policy Compliance Review Findings. The following summarizes the final HQUSACE policy compliance review findings for the feasibility report and EA on the proposed project for the Lower Colorado River Basin Phase I, Texas

This summary includes the concerns and the related resolutions of those concerns for the HQUSACE reviews of the January 2006 Alternative Formulation Briefing documentation for the Wharton Interim Feasibility Study and the March 2006 Alternative Formulation Briefing documentation for the Onion Creek Interim Feasibility Study. Prior to submittal of the draft report, these studies were combined into the Lower Colorado River Basin Phase I report with two separable study elements, Onion Creek and Wharton. This summary also includes the HQUSACE reviews of the August 2006 Draft Lower Colorado River Basin report and the October 2006 Final report.

In the opinion of the policy compliance review team, all policy review concerns have been adequately addressed for this phase of project development. The AFB review information was originally documented in the CECW-PC Project Guidance Memorandum (PGM) dated 16 March 2006 for Wharton and 16 March 2006 for Onion Creek. The draft report review information was previously documented in a CECW-PC memorandum dated 10 August 2006 and the final review documentation was documented in a CECW-PC memorandum dated 9 September 2006.

2. Project Location. The proposed study area is located within the Lower Colorado River basin, and is broken into sub-areas for evaluating various portions of the study. This report deals with the sub-areas of Wharton County, Texas, including the City of Wharton, and the Onion Creek watershed.

Wharton County is bounded by Colorado County, Austin County, Fort Bend County, Brazoria County, Matagorda County, and Jackson County. It encompasses an

area of 1,095 square miles. The City of Wharton is the county seat, located near the center of Wharton County. The City of Wharton lies approximately 55 miles southwest of Houston, 142 miles from Austin, 173 miles from San Antonio, and 200 miles from Corpus Christi, and is bounded by U.S. Highway 59 to the west and the Colorado River to the south.

The Onion Creek watershed encompasses approximately 343 square miles and is located primarily in southern Travis and northern Hays Counties, with a minor part of the upper portion of the basin extending into eastern Blanco County. Major tributaries on Onion Creek include Cottonmouth, Williamson, Marble, South Boggy, Slaughter, Rinard, Bear and Little Bear Creeks. The Williamson Creek watershed, which is one of the focal points in the study, encompasses approximately 31 square miles, has a river-length of approximately 17.5 miles (from Onion Creek to the headwaters) and lies entirely within Travis County. Major tributaries to Williamson Creek include St. Elmo, Pleasant Hill, Sunset Valley, Cherry Creek, Kincheon Branch, Motorola, and Scenic Brook. Williamson Creek originates southwest of the City of Austin near the Balcones Escarpment and flows about 17.5 miles before its confluence with Onion Creek near Austin-Bergstrom International Airport

3. Authority. Authorities for conducting studies within the Colorado River Basin of Texas have been in place since the mid-1930's. For this study, there are several historical, but applicable, authorities as quoted below:

Resolution by the Committee on Commerce, United States Senate, adopted August 4, 1936:

> *"Resolved by the Committee on Commerce of the United States Senate, That the board of Engineers for Rivers and Harbors created under Section 3 of the River and Harbor Act, approved June 13, 1902, be and is hereby, requested to review the reports on Colorado River, Texas, submitted in House Document Number 361, Seventy-first Congress, second session, and previous reports, with a view to determining if improvement in the interest of commerce and flood control is advisable at the present time."*

River and Harbor Act, approved August 26, 1937:

> *"Section 4. The Secretary of War is hereby authorized and directed to cause preliminary examinations and surveys to be made at the following named localities.....Colorado River, and its tributaries, Texas, with a view to its improvement in the interest of navigation and flood control."*

River and Harbor Act, approved March 2, 1945:

> *"Section 6. The Secretary of War is hereby authorized and directed to cause preliminary examinations and surveys to be made at the following named localities.....Colorado River, Texas."*

In addition to the broad, basin wide authorities noted above, more specific authority was provided for the Onion Creek portion of the study. This authority is contained in a resolution by the Committee on Transportation and Infrastructure, United States House of Representatives, adopted May 6, 1998, as quoted below:

> *"Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That the Secretary of the Army is requested to review the report of the Chief of Engineers on the Colorado River, Texas, published as House Document 361, 71st Congress, 2nd Session, and other pertinent reports, with a view to determine if improvements to the Onion Creek watershed in the interest of flood damage reduction, environmental restoration and protection, and other related purposes are advisable at the present time."*

4. Non-Federal Sponsors. The Lower Colorado River Authority (LCRA) is the official non-Federal sponsor for the Lower Colorado River basin studies, and has entered into a 50/50 cost sharing agreement with the Corps. The LCRA, in turn, has entered into numerous inter-local agreements with other non-Federal entities within the basin for the purpose of sharing the non-Federal responsibilities among the interested and affected parties. For the portions of the study that affect the Wharton area, the City of Wharton provided cash and/or in-kind services, with LCRA acting as the focal point for all activities. For investigations within the Onion Creek watershed, additional local cost sharing sponsors included the City of Austin, Travis County, and the City of Sunset Valley.

5. Problems, Needs And Opportunities. The Lower Colorado River Basin study is a comprehensive, holistic investigation of water resources problems, needs and opportunities to determine whether there is a Federal interest to participate in improvements within the basin for flood damage reduction and ecosystem restoration. The Lower Colorado River Basin Phase I is broken into sub-areas for evaluating various portions of the study. This report deals with the sub-areas of the Onion Creek watershed and the City of Wharton. Problems in the Onion Creek Watershed include flooding to over 1,600 structures with direct economic losses estimated to be approximately $5 million annually, degradation to the environment, fueled primarily by urbanization and development pressures, and the lack of sufficient recreation facilities to meet the demands of the growing population. The entire City of Wharton is within the 500-year floodplain and most of it is within the 100-year floodplain. 800 homes were damaged by flooding in 1998. 100 homes were damaged by flooding in 2002. Equivalent annual damages are estimated at $4.5 million.

6. Plan Formulation. An overall basin wide consideration was given to economic, social, and environmental impacts for each alternative during the development of long-term solutions to the flood problems within the Lower Colorado River Basin. Appropriate Corps of Engineers engineering and design manuals, criteria, and regulations

relating to flood control channels, outlet works, embankment, stream flow routing, backwater computation, cost estimates, etc., were used in developing alternative plans.

In selecting alternative plans for flood damage reduction, a full range of structural and nonstructural measures were considered. These were discussed at the Feasibility Scoping Meeting held on August 20-21, 2003.

Structural measures consist of diversion structures designed to control, divert, or exclude the flow of water from the flood prone areas, regional detentions, levees, floodwalls, and channel modifications. Nonstructural measures attempt to avoid flood damages by exclusion or removal of damageable properties from the flood prone areas. These measures do not affect the frequency or level of flooding within the floodplain; rather, they affect floodplain activities. Raising of structures and floodplain evacuation (buyout) were measures considered in this analysis.

The basic alternative to any flood damage reduction plan is the No Action plan. Adoption of this alternative implies acceptance of the costs and adverse effects of continued flooding. The No Action alternative would recommend no plan and require no allocation of Federal funds.

7. Selected Plan. The selected plan involves two distinct areas within the Onion Creek Watershed, Timber Creek and Onion Creek Forest/Yarrabee Bend, and the City of Wharton.

Timber Creek: The NED/NER Combined plan, consisting of the acquisition and removal of 81 residential structures and 90 parcels of land in the 4% ACE floodplain, in combination with recreation features and ecosystem restoration, was selected as part of the Recommended Plan. The plan would combine recreational features including 20 picnic shelters, 8 small group shelters, 1 large group shelter, 5,300 feet of unpaved trails and 1,200 feet of paved 10 foot wide trails, 2 basketball courts, one waterborne restroom, 12,000 square feet of parking, and the infrastructure associated with these facilities on 40 acres of land. The ecosystem restoration would include restoring riparian woodlands on an additional 16 acres.

Onion Creek Forest/Yarrabee Bend: The NED/NER Combined Plan was selected as the Recommended Plan. The plan consists of acquisition and removal of 410 residential structures located in the 4% ACE floodplain, in combination with recreation features and ecosystem restoration. Recreational features include 32 picnic shelters, 32 small group shelters, 1 large group shelter, 7,860 feet of unpaved trails and 9,680 feet of paved 10 foot wide trails (including 1 footbridge), 7,400 feet of equestrian trails, 4 basketball courts, 2 tennis courts, 19 volleyball courts, one waterborne restroom, 20,000 square feet of parking, and the infrastructure associated with these facilities. The Recommended Plan would result in a 100-acre park. The highest economic net benefits and high project performance, together with the increase in ecosystem habitat units and the plan's ability to most closely meet the planning objectives were the primary reasons for selection. Approximately 190 additional acres would be restored to riparian woodlands.

Wharton: The NED plan was selected as the Recommended Plan. The plan includes approximately 20,300 feet of levees (5 feet average height) and 1900 feet of floodwalls (4 feet average height) along the Colorado River, 6600 feet of levees (3 feet average height), 380 feet of floodwalls, and 7000 feet of channel modification (3 feet average height) along Baughman Slough, and three significant features to facilitate the drainage of Caney Creek. Some refinements of the plan were incorporated into the Recommended Plan, with the most significant being the incorporation of additional interior drainage facilities to adequately address any ponding issues resulting from implementation of the levee system. The plan would effectively remove the vast majority of the City of Wharton from the designated 1% chance floodplain.

8. Project Costs. The estimated first cost of the Wharton and Onion Creek components are approximately $27,430,000 and $82,730,000 respectively for a total of $110,160,000 at August 2006 price levels. Equivalent annual cost for Wharton and Onion Creek components are approximately $1,680,000 and $4,360,000 respectively for a total of $6,040,000.

9. Operation, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R). The non-Federal sponsor will operate and maintain the project in accordance with the procedures and schedules set forth in an Operation and Maintenance manual. The total estimated annual cost of operation, maintenance, repair, rehabilitation, and replacement for the recommended plan is $230,000, which includes both flood control and recreation features. The major items involved would include: maintenance of benches, regular maintenance of park facilities, restriping access areas, debris cleanup, selective trimming in restoration and invasive species control, levee embankment mowing, management of the mitigation areas, and operation and maintenance of the inlet and outlet control structures pertaining to the sumps. An operation and maintenance manual would be prepared by the Corps after completion of the project, and periodic inspections would be conducted to ensure that all required maintenance was being performed.

10. Project Benefits. Total equivalent annual benefits for Onion Creek component is $6,010,000. This benefit is comprised of $2,950,000 for flood damage reduction and $3,060,000 for recreation. The Onion Creek component also achieved average annual habitat units of 62.6 associated with an annual cost of $310,000. These benefits compared to the annual cost of $4,360,000 (excluding the $310,000 ecosystem restoration costs) yields net benefits of $1,960,000.

Wharton Creek component had equivalent annual benefits of $3,640,000 all for flood damage reduction. A comparison of the annual cost for the Wharton component of $1,680,000 to the annual benefits yields net annual benefits of $1,960,000.

11. Cost Sharing. The non-Federal sponsors are responsible for a minimum cash contribution of 5 percent, all lands, easements, rights-of-way, relocations, and disposal (LERRD) costs, plus additional cash, if necessary, to reach the minimum 35-percent threshold, based on the cost sharing principles of Section 103, Water Resources

Development Act of 1986, as amended by Section 202, Water Resources Development Act of 1996. Cost apportionments for the Recommended Plan are broken down by the Onion Creek and Wharton components of the project. The Wharton component includes a betterment of the interior drainage facilities, which is desired by the sponsor at full non-federal cost. The Federal share of the Wharton component is $16,620,000 (60.6%) and the non-Federal share is $10,810,000 (39.4%). The Federal share of the Onion Creek component is $52,670,000 (63.7%) with the non-Federal share being $30,060,000 (36.3%).

12. Environmental Compliance. The Finding of No Significant Impacts (FONSI) was signed on 10 October 2006 for both Onion Creek and Wharton components.

B. REVIEW COMMENTS ON THE JANUARY 2006 ALTERNATIVE FORMULATION BRIEFING PACKAGE FOR WHARTON.

1) Study Authority.

COMMENT: The cited May 6, 1998 House study resolution specifies a review of prior reports with a view to determine whether improvements in the Onion Creek Watershed are warranted. Page 1-2 states that a separate interim study is underway for Onion Creek. Since the House resolution is specific to the Onion Creek Watershed, it does not appear to provide authority for the Wharton Interim Feasibility Study, nor interim studies on the other tributary watersheds. Page 1-1 also cites other older authorities as applicable. The District should verify that these authorities remain open, i.e., that they were not completely satisfied by other reports. (This would be the case, for example, if there are no reports under a study authority, or if there were, such reports state that they are in "partial" rather than "full" response to the study authority in question). In addition, the District should verify that none of these authorities were deauthorized under Section 710 of the 1986 WRDA, as amended, 33 U.S.C. 2264.

RESPONSE: The primary authorization is the same as that cited in the Budget papers. There are four other open, but older, authorities that are applicable. Section 4 of the River and Harbor Act, dated August 26, 1937, is an example of one of the Basinwide authorities which have never been closed out. These are several other authorizations also cited in the documentation. These authorities also are denoted in the Final Programmatic EIS for which a ROD was signed in January 2006.

DISCUSSION: HQ remains concerned about whether the cited older study authorizations are still open. The District agreed to do further research, as well as get Counsel to concur with the findings, and provide this information to HQ prior to release of the draft report.

The District's findings are summarized below:

District records indicate that as late as 1992 these authorities were used for the Interim Study of Shoal Creek and its construction authorization in WRDA 1992. Since that time, no reports were submitted which would have possibly closed out the older authorities, leaving Section 710 as the only possible means that the authorities would have become null and void. For studies to be deauthorized under Section 710, it must be included in a list that is transmitted to Congress from Headquarters. Inquiries made around HQ by Mr. Blakey concluded that in all likelihood, no such list has ever been transmitted to Congress. In the absence of any evidence to indicate the studies have been deauthorized or closed out, the 1936, 1937, and 1945 basin wide study authorizations which were cited in the certified 905(b) report are, in fact, still valid. The District provided these findings to their Office of Counsel, which in turn has rendered a positive opinion on the matter. Their complete package is attached as part of this PGM.

REQUIRED ACTION: The District will drop the Onion Creek Study resolution from its list of applicable authorizations.

ACTION: See page 1-1. Statement was removed from text, only Colorado River reference remains.

HQ ANALYSIS: Resolved

2) Problems and Opportunities, Objectives and Constraints.

COMMENT: The documentation does a good job to concisely define the general problem and define the objectives and constraints. However a more detailed explanation of the problems and opportunities are needed. Although the document does describe the flooding both from an historic and current approach, a clear statement of specific problems and opportunities included along with the objectives and constraints will aid in the overall flow of the document. Problem definition can be expanded to identify the nature, cause, location, dimensions, origin, time frame, and importance of the problem, as well as an indication of who considers this a problem. An opportunity can be defined the same way. The discussion of the environmental restoration opportunities found in the existing conditions section should also be included in this section.

RESPONSE: The draft report will include a chapter entitled Problems and Needs. The economics and H&H appendices also contain information that describe the flooding problem that exists throughout the city and that flooding originates from several related sources, thus yielding a highly complex situation. More details will be added to the draft report regarding opportunities in other areas. The local sponsor advised the Corps during the early stages of the study that they wanted the study to solely focus on resolution of the flooding in a most cost effective manner. Thus, discussions on ecosystem restoration and recreation opportunities were necessarily limited.

DISCUSSION: The response resolved the comment regarding opportunities in other areas.

REQUIRED ACTION: The information identified in the District's response will be added to the draft report.

ACTION: Chapter 3 added. See pages 3-1 to 3-1 and 3-19.

HQ ANALYSIS: Resolved

3) Inventory and forecast.

COMMENT: Step 2 of the planning process involves inventorying and forecasting conditions. The AFB documentation provides broad discussions of various resource conditions, but not specifics. According to ER 1105-2-100, Chapter 2 and Appendix E, it is necessary to quantify and qualify the planning area resources (physical, demographic, economic, environmental, social, etc.) relevant to the identified problems and opportunities. The inventories of historic and existing conditions are the basis for analyses of future conditions and project impacts and benefits. It is difficult to understand how the district determined impacts to various resources, or attempted to lessen impacts to resources, when this information has not been provided. Inventory and forecasts need to be done for all relevant resources in the planning area.

RESPONSE: The documentation should have more clearly and explicitly referenced the PEIS that was completed. This will be corrected in the draft report. The PEIS is intended to serve as the basis for all NEPA documentation, from which the EA will be tiered.

DISCUSSION: The report can reference the PEIS, but it must still be a stand along Environmental Assessment, and it must be specific to Wharton.

REQUIRED ACTION: The District will include more details in the draft report, as requested. This effort has already been started.

ACTION: PEIS is now incorporated by reference. Also, data detailed in Appendices A and B. See page 1-15 and 5-17.

HQ ANALYSIS: Resolved

4) Cultural resources.

COMMENT: A brief discussion of existing conditions of cultural resources is found on pages 2-12 to 2-13. The district indicates that it there is a high potential to find prehistoric archeological sites adjacent to the waterways and there are numerous historic buildings in town. Of particular archeological importance is the Baughman Slough area where a there is a high probability to yield evidence of prehistoric sites. The district then concludes that an archeological survey is "recommended" for the banks of Baughman Slough and adjacent areas slated for impact. More complete information on the presence of archeological sites within the project area and potentially impacted by project construction needs to be provided.

RESPONSE: A partial survey of the project area has been conducted and no archeological sites were identified. A cultural resources investigation will be

contracted out to complete this evaluation. The Task Order will be issued in April 2006 and a report will be completed by May 2006. Cultural resource impacts have not affected the comparison of alternatives and are not expected to do so.

DISCUSSION: Response is sufficient.

REQUIRED ACTION: The District will ensure that all the additional information is included in the draft report.

ACTION: A complete discussion can be found on pages 2-25/26.

HQ ANALYSIS: Resolved

5) Mansfield dam.

COMMENT: The document states that Mansfield Dam has decreased the Colorado River peak flows through the City of Wharton, but flooding has still occurred. More information needs to be provided to explain the impacts of this flood control structure on the flooding problems in Wharton. Was this dam expected to reduce damages in Wharton? What was the expected reduction in damages? What would the existing damages be without the dam? Is there a potential change in the operation of Lake Travis that may impact Wharton?

RESPONSE: Extensive Basinwide hydraulics were conducted as a precursor to the Wharton Interim Feasibility Study. As a result, the following information is available.

Frequency	*Current Q (Unsteady HEC-RAS, cfs)*	*Pre-1941 Estimated Unregulated Q (cfs)*	*% Reduction*
2-yr	25,270	25,100	-0.7%
5-yr	44,070	54,000	18.4%
10-yr	59,355	62,800	5.5%
25-yr	78,160	117,000	33.2%
50-yr	90,770	167,600	45.8%
100-yr	98,315	215,200	54.3%
500-yr	204,795	392,100	47.8%

Mansfield dam has been in place since 1941. It was constructed to help reduce flooding downstream, but quantification of this expectation at Wharton is unavailable. Since the operation is already fairly optimized and the dam is about

240 miles upstream, no change in operation of Mansfield Dam, would make an appreciable difference in the flooding that is experienced in the Wharton area.

DISCUSSION: There was some discussion on whether the operating plan at Lake Travis could be changed to reduce the damages incurred at Wharton. The District responded by sharing some results of an optimization analysis performed for the Highland Lakes Interim Feasibility Study. The analysis concluded that any change in operations would result in an insignificant change below Bastrop.

REQUIRED ACTION: The District will include the information provided in the response in the feasibility report for Wharton

ACTION: See Table 3-2 on page 3-5.

HQ ANALYSIS: Resolved

6) Historic floods.

COMMENT: Table 1-1 list historic Wharton floods. From 1913 to 1940 there were five floods listed all with flows greater than 100,000 cfs. From 1940 to present there are four floods listed. Three of those floods had flows less than 75,000 cfs with one flood with a flow of 92,000 cfs. Provide an explanation of this table in the text. Are the flows lower after to 1940 because of Mansfield Dam?

RESPONSE: As shown in the response above, the Highland Lakes did have an effect on discharges. Several events that occurred above Mansfield Dam in the 1950's might have produced discharges above 100,000 cfs at Wharton, but instead failed to match pre-1940 historic events.

DISCUSSION: The response provided for the previous comment is adequate.

REQUIRED ACTION: No further action required.

ACTION: None.

(5) Extent of flooding problem.

COMMENT: The report does not provide an adequate description of the extent of the flooding problem. There is not sufficient information to accurately describe the flooding problem.

ER 1105-2-100 Appendix E page E-95 states:
"(a) Flooding. Describe the flood situation, including a designation of high hazard areas.
The description should include characteristics of the flooding, such as depths, velocity, duration, and debris content; area flooded by floods of selected frequencies, including 100-year frequency [.01 annual probability]; historical

floods, and, where applicable, larger floods. [Description of flood characteristics for a given frequency or discharge should be based on the median probability discharge. The regulatory floodplain as defined by the National Flood Insurance Program will always be described.]"

ER 1105-2-100 Appendix E page E-112 further states:
"The summary tables should include pertinent land use data for computing not only NED benefits, but also environmental, social, and regional impacts. Also present other floodplain data pertinent to the evaluation on one or more maps: Flood limits and depths with and without the project; current and future land use; and 100-year [.01 annual probability] and other flood limits and depths."

Some of the information described above is provided but more detail is needed specifically dealing with the depth of flooding and when significant damages begin to accrue. Many of the structures flooded are identified as outbuilding, such as sheds and garages. When do damages begin without considering these outbuildings? This information would help to understand the nature of the flooding.

RESPONSE: Figure 12, page 44 of the Hydrologic and Hydraulic Analysis, provides an approximation of the 100-year baseline conditions. As can be expected, flooding from the Colorado River, which as a contributing drainage area of over 14,000 square miles below Lake Travis, can last upwards of a week. Also, much of the Caney Creek drainage is constrained by its ability to discharge into the river. Thus, flows are often slow and sluggish. Comparatively, Baughman Slough is a much smaller stream, and although the slope is fairly flat, the stream rises and falls quickly in comparison to the Colorado River. Finally, floor elevations of the main structures were applied in the flood damage analysis as well as on the outbuildings because they were generally found to be similar to the primary structures. As such, the start of damages for each reach is not related to the inclusion of outbuildings. Estimates of start of damages for each reach will be listed in the Economics Appendix and/or main report.

DISCUSSION: The response provided only partial resolution. HQ requested that additional information regarding the depth of flooding be provided in the draft report. The District agreed.

REQUIRED ACTION: The District will provide additional information regarding the depth of flooding in the draft report, as requested.

ACTION: See Economic Appendix , page A-21.

HQ ANALYSIS: Resolved

7) Future without-project condition.

COMMENT: The submittal is silent regarding the future without-project condition and appears to evaluate the alternatives against the existing conditions. All alternatives should be measured against the future without-project condition (see item 2 in Exhibit G-5 and paragraph 2-4b, ER 1105-2-100). Explain the differences between the existing and future without-project conditions and how the differences would affect the plan formulation, evaluation, and selection. This issue is significant because adjusting the base condition could conceivably lead to the selection of a different plan. If the district believes that the future without project conditions are the same as existing conditions the district must state this and substantiate it.

RESPONSE: Current land use outside the immediate Wharton area (where the vast majority of the watersheds' drainage areas are located) is predominately agricultural in nature and future without project conditions are predicted to remain the same as existing conditions. Within Wharton, the intensification level of the urbanization is also expected to remain steady. Other areas within the Colorado River watershed are forecasted to undergo a extensive urban development but are located over 200 miles upstream. These areas make up a very small percentage of the contributing drainage area. The PEIS contains additional information on future conditions within the study area. Additional information on future without project conditions will be added to the draft report.

DISCUSSION: HQ explained that its position was tied to a 3% increase in population during the last census period, which could be extrapolated to indicate the potential for a cumulative of 15% increase during the 50-year project period. The District responded by stating that the future without-project condition will be more clearly defined, and it will be clear that there is no significant difference in existing versus future without-project conditions. Concurrence was obtained.

REQUIRED ACTION: The District will include clarification of future without-project conditions and rationale for conclusion that no significant difference between existing conditions and future without-project conditions.

ACTION: Discussion on Future Without Project Conditions, pages 3-22 to 3-23.

HQ ANALYSIS: Resolved

8) Environmental justice (EJ).

COMMENT: Discussion of EJ is included in Corps documents to comply with an Executive Order. Although data used to identify and locate minority and low-income populations can be in the *Existing Conditions* section (i.e. populations, employment, income, etc...), this topic should be moved to *Environmental Compliance* and *Scoping and Public Coordination* sections of the draft and final documents.

RESPONSE: Concur.

DISCUSSION: No further discussion.

REQUIRED ACTION: Information will be moved to appropriate section of the draft report, as requested.

ACTION: See page 5-19 to 5-20.

HQ ANALYSIS: Resolved

9) Land use.

COMMENT: Further detail is needed that quantifies and qualifies the "agricultural, heavy woods, industrial, light woods, public, residential, and water" land uses identified in the report. The map provided is a good general reference; however it does not convey effectively the detail needed.

RESPONSE: More detail regarding land use within the general vicinity of Wharton will be included in the draft report.

DISCUSSION: HQ reiterated that the baseline and inventory data need to be described in more detail in the report, and that a habitat assessment needs to be done. The District agreed.

REQUIRED ACTION: The District will provide the additional data and assessment in the draft report, as requested.

ACTION: See page 2-3.

HQ ANALYSIS: Resolved

10) Aquatic resources.

COMMENT: A discussion of all types of water resources and habitats (particularly riverine, floodplains, wetlands and other special aquatic sites) should be included in this section. Details need to be provided on the quantity and quality of these resources within the project area. It may also be appropriate to move *General Water Quality* to its own heading after *Air Quality*.

RESPONSE: Additional information on habitats will be provided in the draft report. Direct impacts caused by the proposed levee and channelization have been calculated. No direct impacts to wetland habitats will occur. The levee along the Colorado River will cross sixteen water bodies (either natural tributaries or upland drainage ditches) and will impact a total of 1.38 acres of open water. The Colorado

River levee will also impact 14.29 acres of riparian forest habitat along the shoreline. The riparian habitat was dominated by: pecan, hackberry, osage orange, cedar elm, American elm, poison ivy, green briar, vibernum, mustang grape, and yaupon.

The channelization of Baughman Slough will impact 8.40 acres of open water areas. The adjacent levee will impact 7.59 acres of riparian forest.

The quality of these aquatic resources will be documented when the Habitat Assessment is conducted. Secondary impacts to aquatic resources will be calculated when the working right-of-way width is established. Secondary impacts will include: reduction in wetland hydrology due to modifications of the floodplain, additional clearing, establishment of barrow sites for material, and other impacts.

DISCUSSION: These values are different that shown in the previous documentation. HQ stressed the need for consistency, and that in the draft report, more detail needs to be shown on the inventory. The District concurred, and reported that the analysis will be completed within a month. At that point, the values will become more stable. It was noted that due to the kinds of alternatives being considered, impacts to aquatic resources will not likely be a major factor.

REQUIRED ACTION: The District will provide the updated values and will ensure consistency in the presentation of the values in the draft report.

ACTION: See Appendix B, tables B-5 through B-7 and page B-4 (Water Quality). Also, included in Main Report on pages 2-6 and 2-17 to 2-20.

HQ Analysis: Resolved with the following recommendations: To clarify, the original comment was in regards to existing conditions, not project impacts. The Study Area Description - Environmental Setting Section of the draft report (which details existing conditions) still does not summarize the quantity and quality of aquatic resources, such as wetlands, in the project area. Details can be provided in the appendix. A short summary should be placed in main report. This should be done for all habitat types that were evaluated, as shown in Appendix B.

RESPONSE: The District included a summary of the quantity and quality of the aquatic resources and all other habitat types in the appropriate sections in Chapter 2.

HQ Analysis: Resolved

11) Vegetational area.

COMMENT: This section needs to include a detailed discussion of all types of terrestrial resources and habitats within the project area. The *Ecoregions* discussion is generic to Wharton County and may better be included as a general description of the area prior to specifics being provided in *Aquatic Resources* and *Vegetational Area* sections. Renaming Vegetational Area to Terrestrial Resources may improve understanding of what information is included in this section.

RESPONSE: The proposed Colorado River levee will have a direct impact to 14.07 acres of grassland habitat. Grassland habitat includes pasture, agricultural land, residential backyards, transportation right-of-ways, and parks. There is no natural prairie within the proposed project. The levee impact to grassland habitat is considered temporary since the area will restore to similar habitat despite the change in elevation. The levee will also have a permanent impact to 0.59-acre of upland forest.

The proposed Baughman Slough levee and channelization will have a temporary impact on 14.50 acre of grasslands.

The quality of these terrestrial resources will be documented when the Habitat Assessment is conducted. Secondary impactw mores to terrestrial resources will be calculated when the working right-of-way width is established. Secondary impacts will include: reduction in wetland hydrology due to modifications of the floodplain, additional clearing, establishment of barrow sites for material, disposal sites, etc.

DISCUSSION: Discussed as part of comment 3. c. (9)

REQUIRED ACTION: The District will provide the information and make the revisions in the draft report, as requested.

ACTION: See Appendix B, tables B-5 through B-7 and page B-4 (Water Quality). Also, included in Main Report on pages 2-6 and 2-17 to 2-20.

HQ Analysis: Resolved with the following recommendations:

For clarification, this original comment was related to existing conditions, not project impacts. The original comment also may have been confusing in regards to recommended organization of the existing conditions section of the report. HQ recommends that the district revisit the organization. For example, the "Wetlands" discussion on page 2-21 would be more appropriate under the "Aquatic Resources" section, instead of "Terrestrial Resources." Perhaps a "Terrestrial Resources" heading is not needed. "Bottomland Vegetation" and "Grasslands" may be stand alone headings, as can "Wildlife," which includes discussion of both aquatic and terrestrial species (wildlife and fish). "Threatened and Endangered Species" may be a subsection of "Wildlife." Additionally, "Migratory Birds" are presently listed as a

subsection of "Threatened and Endangered Species" but migratory birds as a whole are not necessary listed species. "Migratory Birds" is an appropriate subsection to "Wildlife."

Additionally, it was noted that on page 2-19 the report states that within the project area, 44% of the area is grasslands, 32% is croplands, 13% urban, 7% other, and 4% riparian woodlands. The report would be clearer if these percentages corresponded to the "Land Use" statistics on page 2-13. Each resource-specific section (Bottomlands and Grasslands) should include acreages; for example, the "Wetlands" discussion on page 2-21 indicates 118 acres of wetlands in the project area.

RESPONSE: Concur, the District moved the wetlands discussion under the Aquatic Resources section on page 2-18. Terrestrial Resources was renamed Vegetation Cover Types on page 2-24. The vegetation cover types were then described with the approximate number of acres within the study area. T&E was moved under the fish and wildlife section and fisheries was described under the fish and wildlife section starting on page 2-20. The migratory bird discussion was also moved under fish and wildlife.

HQ Analysis: Resolved

12) Wildlife resources.

COMMENT: This section provides brief lists of fish and wildlife species that are found in Wharton County. Further information should be provided regarding the fish and wildlife resources within the project area. A heading of *Fish and Wildlife Resources* may provide a more comprehensive description of the information provided.

RESPONSE: Additional information on these resources will be included in the draft report. During a site visit, conducted on 10 January 2006, with the FWS the following species were observed within the riparian forest adjacent to the Colorado River: red tail hawk, red shoulder hawk, vermillion fly catcher, turkey vulture, savannah sparrows, and great egret.The proposed project is located within the migratory bird corridor. A section will be included specifically for migratory birds.

DISCUSSION: Discussed as part of comment 3. c. (9)

REQUIRED ACTION: The District will provide the information and make the revisions in the draft report, as requested.

ACTION: See Appendix B, pages B-23to 24). Also, included in Main Report on page 2-25.

HQ ANALYSIS: Resolved

13) General comment on environmental resources discussions.

COMMENT: The AFB documentation stated on page 2-8 that the Lower Colorado Regional Water Planning Group recommended that the segment of the Colorado River through Wharton County be designated as "Ecologically Unique" per a Texas Administrative Code, due to undeveloped riverine habitat, location in the Central Flyway for migratory birds, and the presence of a state-listed endangered fish. The sections under *Existing Conditions* should elaborate on these unique factors and indicate to what extent they are within the project area, i.e. unique or valuable riverine habitat should be thoroughly discussed under *Aquatic Resources* and the importance of the area as a flyway for migratory birds and habitat for Federal and state threatened and endangered species should be thoroughly discussed under *Fish and Wildlife Resources*.

RESPONSE: Further detail will be included in the Aquatic Resources and Terrestrial Resources section of the draft report to focus on habitat important to migratory birds and endangered species.

DISCUSSION: No further discussion.

REQUIRED ACTION: The District will provide the information and make the revisions in the draft report, as requested.

ACTION: See Appendix B, page B23 to B24.

HQ ANALYSIS: Resolved

14) General aesthetics.

COMMENT: *Population and Statistics, Noise* and *Traffic* are not aesthetics. Please reference ER 1105-2-100, section C-5, page C-37. This section should be changed to *Social Resources* or *Social/Economic Resources*. Appendix D of the ER discusses economic and social considerations.

RESPONSE: Concur. This will be corrected.

DISCUSSION: No further discussion.

REQUIRED ACTION: The District will make the revisions in the draft report, as requested.

ACTION: See page 2-27 and 2-28.

HQ ANALYSIS: Resolved

15) Recreation.

COMMENT: The AFB documentation should include a discussion of recreation as part of the existing condition.

RESPONSE: The Draft Report will include a brief discussion of existing recreation facilities in Wharton County. Additional recreation features are not being evaluated or proposed as part of this study.

DISCUSSION: No further discussion.

REQUIRED ACTION: The District will provide the information in the draft report, as requested.

ACTION: See pages 2-25 to 2-27.

HQ ANALYSIS: Resolved

16) No action plan.

COMMENT: Page 4-5 inappropriately states that the "No Action" alternative was eliminated from further consideration. In accordance with NEPA regulations (40 CFR 1502.14(d)), no action must always be considered a viable alternative in the final array of plans. No action is the default choice if no other alternatives are viable. See page 181 of the Planning Manual (IWR Report 96-T-21) for more information. The draft report should include the "No Action" alternative in the final array of plans.

RESPONSE: Concur. This will be corrected.

DISCUSSION: No further discussion.

REQUIRED ACTION: The District will make the revisions in the draft report, as requested.

ACTION: See pages 4-4 and 4-31.

HQ ANALYSIS: Resolved

17) Description of alternatives.

COMMENT: The alternatives are inadequately described. For example, the approximate length and height of the three alternate Colorado River levee plans are not presented, nor are the LERRD requirements for any of the measures. The description of the physical features that comprise each alternative should include

the purpose, location, composition (e.g., materials and methods), size, LERRD requirements, and implementation costs in the appropriate Code of Accounts (to include PED, LERRD, construction, and OMRR&R costs). Contingencies and IDC should be identified. See item 3a in Exhibit G-4 and item 3b in Exhibit G-5, ER 1105-2-100.

RESPONSE: Concur. Additional documentation is provided. Further, a table containing a breakdown of costs is provided as an addendum to this documentation. This information will be incorporated into the draft report as well.

DISCUSSION: HQ stressed that the physical features of the alternatives still need to be described in more detail. The District committed to placing additional more detailed descriptions in the draft report, as well as the breakdown of costs.

REQUIRED ACTION: The District will provide the information and make the revisions in the draft report, as requested.

ACTION: See table 4-8, as well as additional descriptions, such as paragraph 3, page 4-14, describing the levee template.

HQ ANALYSIS: Resolved

18) Floodplain evacuation.

COMMENT: Floodplain evacuation is identified as an alternative that warrants further evaluation. The document also states that past investigations have demonstrated that permanent evacuation is typically cost effective only up to and including the 4 percent annual chance exceedance (ACE) floodplain. Only areas flooded from the Colorado River were evaluated for flood proofing. These areas did not begin to receive flood damages until an event greater than the 10 percent ACE and did not receive significant damages until the 4 percent ACE. Why were other reaches that begin to accrue significant damages at the 50 percent ACE not evaluated?

RESPONSE: The area frequently flooded by the Colorado River was selected as a potential buyout area for a number of reasons.

(1) The area is contiguous, in one location, and could be converted to either ecosystem restoration or recreation uses.

(2) This is a neighborhood in which over 500 homes have flooded twice since 1998.The average depth of flooding was around 2-4 feet, as opposed to a more shallow type of nuisance flooding which occurs in other parts of the city.

(3) Most homes are small, and in less than excellent condition, due to flooding.

Scattered homes in other areas may receive damage more often, but implementation would not result in a complete solution. Based on the above findings , early in the screening process, it became readily apparent that there wasn't an economically competitive, comprehensive non- structural solution.

It is likely other floodplain evacuation plans could have been formulated in other damage reaches, especially along Boughman Slough. The first costs of such plans quickly escalate, while the beneficiaries are limited to residents actually being vacated. At the urging of the sponsor, a heavy emphasis was placed on plans that would benefit a higher percentage of the population.

DISCUSSION: HQ is still concerned that floodproofing and elevating of structures was not considered in more depth. The District responded that most structures are slab-on-grade, and it is generally not cost effective to elevate these type of structures. Also, HQ wants to see more documentation in the report stating why a combination with non-structural is not favorable. The District stated that the primary structural measure being proposed is a levee system. Levee systems generally provide protection to relatively high levels, so floodproofing measures would not be a good combination with levees.

REQUIRED ACTION: The District will add the additional documentation into the draft report.

ACTION: See page 4-6, last paragraph under floodproofing.

HQ ANALYSIS: Resolved

19) Flood damage evaluations.

COMMENT: The district needs to show in more detail the relationship between stage, frequency and damage. What is the depth of flooding? Are most of the damages associated with floods reaching the first floor? Tables in the Hydraulics and Hydrology Appendix seem to indicate that flood depths would rarely change by more that 2 feet between the zero damage elevation and the 100-year event.

RESPONSE: The analysis indicates that some homes along Baughman Slough and Caney Creek are susceptible to flooding quite frequently. However, due to the shape of the elevation vs. discharge relationship, only relatively shallow flooding is ever incurred. For example, for Caney Creek at Wharton area, the difference in depth between a 5 year and 500 year even is less than 2 feet. Flooding associated with the Colorado River can be deeper, depending upon the location. Graphs have been prepared to more clearly present this relationship, and are included in this response as additional information. For the draft report, the economics appendix will be expanded to these graphs which show the relationship between stage, damage, and frequency, at representative index points for the Colorado River, Baughman Slough, and Caney Creek.

DISCUSSION: No further discussion.

REQUIRED ACTION: The District will provide the information in the draft report, as requested.

ACTION: Graphs are included in Appendix A, Figures A-2, A-3, and A-4.

HQ ANALYSIS: Resolved

20) Outbuildings.

COMMENT: A significant portion of the benefits are associated with outbuildings. How were contents and percent damage computed for these structures? The district needs to show more information.

RESPONSE: A total valuation of each PARCEL was made utilizing data from the Wharton County Tax Appraisal District, together with data collected by performing field investigations. Flood damage analysis studies typically rely on the main structure on each parcel to represent the total value. Standard practice is to estimate the first floor elevation of the main structure as the threshold where major damages commence. However, for this particular study, the local sponsors wanted to know the location and approximate value of all buildings in their floodplain, which meant separating the main building and outbuildings into separate entries within the structure file. The total parcel value was parsed into multiple entries, using building square footage to determine the proportions, with the total value for structures on each parcel remaining the same. A single family house and outbuilding continued to use the same depth damage curve, which produces the same results as if the building have been grouped by parcel. The only change is that each structure was now assigned its own first floor elevation, which should lower the uncertainty.

DISCUSSION: Two important items were left out of the District's response, which would have provided HQ staff with a better understanding. First, it should have been noted that there are typically no basements in Texas. Second, the terrain is quite flat in the area. Together, these two facts mean that basically the same stage vs. damage curves are used for the main structures as well as the outbuildings. Further, the start of damages should be approximately the same.

REQUIRED ACTION: The District will provide the additional information in the draft report.

ACTION: Information is found on page A-8.

HQ ANALYSIS: Resolved

21) Combined frequency-elevation relationship.

COMMENT: The Hydrologic and Hydraulic Analysis Appendix discusses a methodology to determine the of a combined frequency-elevation relationship. How is this relationship used in the economic analysis? How is this relationship changed by each alternative and how are these changes incorporated into the analysis. The district needs to provide more information.

RESPONSE: As part of the hydraulics and hydrology work product, the methodology was used to derive a composite discharge, which was converted to a composite elevation at each cross section for each frequency, resulting in composite water surface profiles. These composite water surface profiles were then imported into HEC-FDA in a traditional manner . The process of deriving a composite water surface profiles had to be repeated for each alternative, depending on the impacts of each specific alternative to the two types of flooding sources.

DISCUSSION: The response is adequate. This information should be included in the report, especially the last sentence.

REQUIRED ACTION: The District will provide the information in the draft report, as requested.

ACTION: Information is found on page A-27.

HQ ANALYSIS: Resolved

22) Induced flood damages.

COMMENT: Page 4-13 indicates that the proposed levees along the Colorado River would increase flood stages downstream and across on the right bank. Table 26 in the H&H analysis indicates that added depths range up to 0.8 foot for an event with a 1 percent chance of exceedence. Page 57 of the H&H analysis indicates that the project would induce increased flooding in Baughman Slough. Page 74 concludes that water surface elevations would rise across from levees and downstream. The AFB read-ahead materials do not indicate whether the increased depths would induce damages, or whether mitigation is necessary (see paragraph 3-3b (5), ER 1105-2-100). These determinations and supporting analyses are needed to confirm that the alternative plans, their economic analyses and their cost estimates are complete, and that the plan selection is appropriate.

RESPONSE: As noted earlier, the reach from Wharton to Bay City is entirely a rural, agricultural area, with few structures, and acres of rice fields. For the 50-year and 100-year profiles only, there will be increased stages due to overflows being kept from escaping into Baughman Slough (San Bernard watershed). The draft report will include an assessment of downstream impacts, using damage curves derived as part of the Basinwide study. There is also a widely known flooding

problem on the San Bernard River, and reducing overflows into Baughman Slough for the 50-year and 100-year storm events will have a small, but beneficial effect on the San Bernard River. Quantification of these effects are beyond the scope of this study. A separate feasibility study is being pursued by Wharton County, but to date, no Federal funding has been appropriated. A real estate investigation will be undertaken to assure that no taking will occur. Further, given the information available, no mitigation action is anticipated. Instead, induced damages will be accounted for in the economic analysis and the impacts displayed and discussed in the report.

DISCUSSION: The response is adequate. The District must assure that the draft report documents the induced damages and addresses them in the economic analysis.

REQUIRED ACTION: The District will provide the information and make the revisions in the draft report, as requested.

ACTION: See bottom of page 5-8.

HQ ANALYSIS: Resolved

23) Lesser plans.

COMMENT: Other than for the proposed Colorado River Levee and the Baughman Slough Levee, the economic analyses and supporting explanations do not demonstrate that smaller plans that would not provide similar or greater net benefits. In order to identify the NED Plan in accordance with paragraphs 2-4d and 3-3b (11) of ER 1105-2-100, evaluate at least one plan smaller than the apparent NED Plan or explain why smaller plans are not practical. This is necessary to ensure that the appropriate plan is designated as the NED Plan.

RESPONSE: The following rationale is provided for each element:

Baughman Slough Channel: A larger plan was identified that has higher net benefits. However, the smaller plan was selected because it met the local sponsor objectives.

Hughes Street Drainage Channel: Three pipes were found as optimal, and the selected plan is bracketed by a smaller and larger plan. A lesser plan of two pipes and larger plan of three box culverts were also investigated.

Richmond Road Pipes: The largest plan evaluated was found to have the highest net benefits. This plan was sufficient to meet the local objectives, and no larger plan was evaluated.

Santa Fe Ditch: As stated in the documentation, the Initial Size, which is an earthen channel with a bottom width of only 8 feet on 1V:3H side slopes, was considered to be the minimum size for ease of construction. Smaller channels may actually cost more while providing less protection. For this reason, no smaller plans were evaluated.

DISCUSSION: The response is adequate. The District must state in the report why smaller plans were not evaluated.

REQUIRED ACTION: The District will provide the information in the draft report, as requested.

ACTION: For Baughman Channel, see page 4-23, paragraph above table 4-4. For Hughes Street, see pages 4-28 and 4-31(bottom). For Richmond Pipes, see page 4-29, paragraph above table 4-6. For Santa Fe Ditch, see page 4-30, second to last paragraph.

HQ Analysis: The Baughman Slough Lower Channel, Caney Creek Outfall Storage Area, and the Crestmont Storage Area (Santa Fe Ditch) presentations lack either analyses (relative to the selected plan) of smaller plans or explanations of why smaller plans are not implementable.

RESPONSE: The requested rationale was included in the draft report. It is located in Chapter 4, under the heading "Consolidation Of Components To Form A Comprehensive Plan," on page 4-33.

HQ Analysis: Resolved

24) Resource impacts.

COMMENT: Determination of impacts to all resources within the project area associated with the formulated alternatives needs to be provided.

RESPONSE: Analysis was performed during the early stages of the study revealed that that all formulated alternatives have similar, insignificant effects to environmental resources. This was not clearly indicated in the documentation, and will be added for the draft report.

DISCUSSION: HQ reiterated that once the inventory of all relevant resources is complete, the impacts need to be assessed for the alternatives. Any mitigation requirements should be indicated and substantiated.

ACTION: Response added to page 4-13. Also, some additional descriptions were added throughout the detailed formulation of alternatives section, as well as Appendix B (for no action and preferred alternative).

REQUIRED ACTION: The District will provide the information in the draft report, as requested.

HQ ANALYSIS: Resolved

25) LERRD requirements for final array.

COMMENT: The LERRD requirements for each plan in the final array were not provided as required by Exhibit G-5, ER 1105-2-100. This information is needed to adequately describe each alternative, and to confirm that sufficient information was used to evaluate and compare the alternatives.

RESPONSE: This requirement was only recently added as part of the revised Appendix G, dated June 2004. Since this information was required to perform the analysis, the new, more detailed technical information requirement will be met by providing an additional table as part of the responses to the AFB comments. The table may be found at the end of this comment/response memorandum.

DISCUSSION: This information needs to be put into the draft report.

REQUIRED ACTION: The District will provide the information in the draft report, as requested.

ACTION: See table 4-8, page 4-34.

HQ ANALYSIS: Resolved

26) Cost estimates.

COMMENT: Implementation costs for each plan in the final array were not provided as required by Exhibit G-5, ER 1105-2-100. The estimates for each final alternative should be in the appropriate Code of Accounts format and should include preconstruction engineering and design (PED), LERRD requirements, construction, and operation, maintenance and repair costs. The implementation costs should include mitigation. Contingencies and economic cost (e.g.; interest during construction) should be identified. This information is needed to confirm that each alternative was adequately developed (i.e., all costs are sufficiently known) prior to comparing and selecting and alternatives.

RESPONSE: See response above.

DISCUSSION: Discussed previously.

REQUIRED ACTION: The District will provide the information and make the revisions in the draft report, as requested.

ACTION: See table 4-8, page 4-34.

HQ ANALYSIS: Resolved

27) Ecosystem mitigation.

COMMENT: The justification of the mitigation measures for each alternative in the final array of plans was not provided as required by Exhibit G-5, ER 1105-2-100. This information is needed to confirm that each alternative was adequately developed prior to comparing and selecting and alternatives, and to confirm that the costs of the selected plan are reasonably complete.

RESPONSE: The mitigation differences for various configurations of structural plans within a highly disturbed, urban environment are nominal, and did not affect plan formulation.

DISCUSSION: Discussed earlier.

REQUIRED ACTION: The District will provide the information in the draft report, as requested.

HQ ANALYSIS: Resolved

28) Price level and discount rate.

COMMENT: The analyses use last year's (FY 2005) price levels and discount rates. Cost and benefit estimates displayed in the final report for the recommended plan and the Locally Preferred Plan, if one is recommended, should be based on the price level and discount rate that are current at the time of submittal. See paragraph D-3d (2), ER 1105-2-100, regarding the appropriate price level. Note that estimates based on the most recent October price level would also fulfill budget document requirements (see paragraph A-2.4d, EC 11-2-187). Per Economics Guidance Memorandum 06-02, the current discount rate is 5-1/8 percent (also see paragraph D-6a (6), ER 1105-2-100, and Section 1.4.11, Principles and Guidelines).

RESPONSE: *Concur. The project economics will be recomputed at the current applicable federal interest rate and displayed in the draft report It is anticipated that the project costs for al the plans investigated will be reduced and resultant BCR's will be slightly higher. Making these changes is not anticipated to impact the formulation decisions.*

DISCUSSION: Discussed earlier.

REQUIRED ACTION: The District will provide the information and make the revisions in the draft report, as requested.

ACTION: See page 5-23 through 5-40.

HQ ANALYSIS: Resolved

29) Project life.

COMMENT: The Economic Criteria section, page 4-3 refers to the "life of the project" apparently in lieu of "period of analysis." A fixed or limited project life means the project would be temporary, something we normally would not implement and that might earn a low budget priority. A project life is indefinite and ends only when Congress deauthorizes the project. Use "period of analysis" to be consistent with paragraph 2-4j, ER 1105-2-100.

RESPONSE: The phrase "life of the project" will be replaced by "period of analysis" for the report.

DISCUSSION: No further discussion.

REQUIRED ACTION: The District will make the revisions in the draft report, as requested.

ACTION: Changes made on page 4-3.

HQ Analysis: Page 4-2 still uses "project life" when "service life" would be more appropriate; i.e., when referring to the length of time between construction and replacement or rehabilitation.

RESPONSE: Concur, the District made the change to Service life on page 4-2.

HQ ANALYSIS: Resolved

30) Hughes street drainage facilities.

COMMENT: The tentatively selected plan in Table 4-8 on page 4-26 includes three 60-inch-diameter pipes for the Hughes Street Drainage Facilities. Table 4-5 states that two 60-inch-diameter pipes would provide essentially the same net benefits, i.e., $115,000 versus $115,400. Three pipes are estimate to cost 45 percent more than two, but would increase net benefits by only 0.3 percent. Where two cost-effective plans produce no significantly different levels of net benefits, the less costly plan is to be the NED Plan, even though the level of outputs may be less (see item 3c in Exhibit G-1, ER 1105-2-100). On that basis, the tentatively selected plan should include two 60-inch-diameter pipes at an estimated cost of $716,000.

RESPONSE: Additional performance indicators were taken into consideration, as well as the rate of return on investment, prior to selecting the three pipe alternative.

The addition of the third pipe will increase the percent damages prevented in the Outfall area from 85% to 96%, leaving annual residual damages of only $7,900. The additional increment has a positive BCR, and it more closely fulfills the study planning objectives. The three 60-inch pipe alternative has an overall BCR of 3 to 1 (5.125% interest rate, 50 year period of analysis). Given the difference in performance coupled with the higher BCR, the three pipe alternative was identified as the tentatively selected plan..

DISCUSSION: Response is adequate. This rationale should be presented in the report, with emphasis on the reduction in residual damages.

REQUIRED ACTION: The District will provide the information and make the revisions in the draft report, as requested.

ACTION: See bottom of page 4-31.

HQ ANALYSIS: Resolved

31) Real estate planning for the tentatively selected plan.

COMMENT: The Real Estate Plan (ER 405-1-12, Chapter 12) should be sufficiently complete in order to provide a reasonably certain estimate of project LERRD requirements and a reasonably certain description of the nature and scope of the non-Federal sponsor's responsibilities and estimated LERRD credit amount. The AFB documentation needs to identify any incomplete items of work that could have a significant effect on project scope, benefits, or costs or provide an assessment of the likely effect. These items are required under item 9 in Exhibit G-5, ER 1105-2-100. This information is needed to confirm that the current real estate planning is adequate to support the plan selection.

RESPONSE: A status of the real estate plan was included in the documentation. Estimated real estate costs were included for each alternative, based on preliminary evaluation. Completion of the real estate plan is not envisioned to have a significant effect on project scope, benefits, or costs.

DISCUSSION: Additional information that was provided by the District revealed that the real estate for the tentatively selected plan was at or less than 10% of the total costs. Thus, there is really no issue.

REQUIRED ACTION: The District will ensure the Real Estate Plan is of sufficient level of detail for the draft report.

ACTION: See Appendix E, Real Estate Plan.

HQ ANALYSIS: Resolved

32) Legal review.

COMMENT: An identification of any legal issues and the status of legal review certification were not provided as required by Exhibit G-5, ER 1105-2-100. This information is needed to confirm that appropriate QA/QC have been or will be completed prior to public release of the draft report.

RESPONSE: There are no known legal issues. A legal review of the report/EA will be conducted, as well as the appropriate QA/QC prior to public release of the draft report..

DISCUSSION: This information needs to be put into the draft report.

REQUIRED ACTION: The District will provide the information in the draft report, as requested.

ACTION: See Certification of legal review provided.

HQ ANALYSIS: Resolved

33) Plan implementation.

COMMENT: A list of future study/project milestones and completion dates were not provided as required by Exhibit G-5, ER 1105-2-100. This information is needed to confirm that a reasonable and supportable path ahead will be presented to the Sponsor and the public.

RESPONSE: The schedule is highly volatile, primarily due to influences beyond our control. Since submittal of the AFB documentation, the schedule has been compressed to deliver a Chief's Report in December 2006. This is in anticipation of possible authorization language being added to a WRDA bill under consideration. The President's FY07 budget does not contain funding for PED. Thus, the official schedule beyond the feasibility is "TBD". However, if Construction Authorization is obtained, and full funding is provided each year, plans and specifications could be completed in FY 2007 and FY 2008, and construction could potentially be initiated in October 2009.

DISCUSSION: The draft report must include milestones, but it is acceptable to tie them to key events instead of actual dates. For example, sign PCA 12 months after complete funding for PED is obtained, and Construction Authorization has been obtained.

REQUIRED ACTION: The District will provide the information and make the revisions in the draft report, as requested.

ACTION: See Appendix E, Real Estate Plan for project schedule.

HQ ANALYSIS: The report is missing an implementation schedule for the recommended plan (see paragraph E-5a, ER 1105-2-100).

RESPONSE: The District added an implementation schedule to the main report

HQ ANALYSIS: Resolved

34) Section 104 credit request.

COMMENT: Page 4-22 states that the City of Wharton submitted a request to construct the Crestmont Storage Area portion of the proposed project in advance of Federal efforts under the authority of Section 104 of WRDA 1986. ASA (CW) approved the credit request January 25, 2006. The draft feasibility report will need to describe the credit request, the status of the advance work, plans for completing any remaining advance work, and the procedures and criteria for awarding credit. The cost-share display(s) should also indicate the cash and LERRD credits. The draft feasibility report will also need to specifically address the usefulness of the non-Federal work for flood damage reduction and the degree it is integral to the proposed Federal project, environmentally acceptable, and economically justified.

RESPONSE: Concur. This information will be included in the draft report

DISCUSSION: Response is acceptable.

REQUIRED ACTION: The District will provide the information in the draft report, as requested.

ACTION: See page 5-41 and table 5-14.

HQ Analysis: Include the date of the ASA(CW) approval on page 5-40 and present the status of the City of Wharton's work thus far and its schedule for completing its work.

RESPONSE: The District included the date of January 25, 2006, and explained the sponsor's progress on the credit. The land has been purchased and construction is underway. Total construction period is estimated to be 18 months. This was added to page 5-46.

HQ ANALYSIS: Resolved

35) Implementation responsibilities.

COMMENT: A description of Federal and non-Federal implementation responsibilities for the Tentatively Recommended Plan was not provided as required by Exhibit G-5, ER 1105-2-100. This would include the basic information

on cost apportionment and whether the standard list of items of local cooperation will be used. This information is needed to confirm that the division of responsibilities is correct prior to public release of the draft report.

RESPONSE: Concur. This information will be included in the draft report.

DISCUSSION: HQ reviewers reiterated the importance of this item, and requested that the District provide the list of local cooperation items to them for concurrence prior to public release of the draft report. The requested list is provided below:

The requirements for structural projects are essentially as follows:

(1) Provide a cash contribution equal to 5 percent of structural flood control features costs.

(2) Provide all lands, easements, rights-of-way, relocations (except existing railroad bridges and approaches thereto) and suitable borrow and dredged material disposal areas (referred to as LERRD).

(3) If the sum of the above two items is less than 35 percent of the costs assigned to flood control, non-Federal sponsors will pay the difference in cash. If it is greater than 35 percent, total non-Federal costs shall not exceed 50 percent of total project costs assigned to flood control. Contributions in excess of 50 percent will be reimbursed by the Federal Government to the non-Federal sponsor. Total contributions in excess of 30 percent may be reimbursed to the Federal government over a period not to exceed 15 years.

(4) Operate, maintain, repair, replace and rehabilitate the project after completion without cost to the United States in accordance with regulations prescribed by the Secretary of the Army.

(5) Hold and save the United States free from damages due to the construction or subsequent operation and maintenance of the project, except those damages due to the fault or negligence of the United States or its contractors.

(6) Prevent future encroachment or modifications, which might interfere with proper functioning of the project.

(7) Participate in the National Flood Insurance Program and other applicable Federal flood plain management programs.

(8) Provide guidance and leadership to prevent unwise future development in the flood plain.

REQUIRED ACTION: The District will include the above information in the draft report, as requested.

ACTION: See pages 5-40 to 5-41.

HQ ANALYSIS: Resolved

36) Interagency coordination.

COMMENT: On page 1-2, the "Study Participants and Coordination" simply states that "there has been coordination with the U.S. Fish and Wildlife Service (USFWS), the Texas State Historic Preservation Officer (SHPO), Texas Parks and Wildlife Service (TPWD), and numerous other State and local agencies." This statement is not sufficient. Coordination is required under various statutes, including NEPA and the Fish and Wildlife Coordination Act (FWCA). The AFB documentation needs to discuss if any issues were raised as a result of this coordination and if these issues impact plan formulation or evaluation. The draft feasibility report needs to specifically list all coordination efforts with relevant Federal and non-Federal agencies and discuss the issues raised by these agencies and how we are addressing them.
ER 1105-2-100, section 4-3(c), page 4-7, indicates that appropriate Federal and non-Federal agencies are to have an opportunity for participation in developing the PMP. The AFB document needs to discuss other agency input into the PMP. Any agency whose input may have a material bearing on alternative formulation, selection or implementation should have been considered for early coordination. Appropriate Federal and non-Federal agencies are also to be invited to participate in AFBs. The AFB document needs to indicate the agencies that have been invited to participate in the meeting.

RESPONSE: Concur. This information will be included in the draft report.

DISCUSSION: The response is acceptable. HQ reiterated the need to document the coordination, and concurrence that the impacts are minimal, if that is indeed the case.

REQUIRED ACTION: The District will provide the information in the draft report, as requested.

ACTION: EA requirements have been integrated into the report, and identified in the table of contents with asterisks.

HQ ANALYSIS: The district's Documentation of Compliance with PGM, dated 17 August 2006, and sent to HQ with the draft report, has the "Action" for this comment as "EA requirements have been integrated into the report and identified in the table of comments with asterisks." This "Action" does not address this comment. Although Chapter 6 in the draft report does discuss involvement of other agencies, it still does not give any indication of what exactly that involvement was (i.e. meetings? or site visits?), and what feedback was received during project

formulation. Appendices show that the district met with the USFWS and USEPA. The final report needs to include a thorough discussion of agency input. Also see HQ Analysis for comment 31) concerning coordination on cultural resources.

RESPONSE: The District documented all agency participation in Chapter 6.

HQ ANALYSIS: Resolved

37) Threatened and endangered (T&E) species consultation.

COMMENT: The AFB document needs to provide a discussion of Endangered Species Act (ESA) Section 7 consultation requirements and any coordination that has been conducted concerning listed species to date (in this case, it appears that the only Federally-listed species in the project area is the threatened bald eagle). The document states that the district corresponded with the USFWS. The document should also include the views of the USFWS, i.e. which species have they determined are in the project area and potentially impacted by the project. If a listed species is affected by the proposed project, the measures that are being developed to protect the species and limit adverse effects should be included.

For state-listed T&E species, similar discussion needs to be added. Since T&E species protection statutes vary by state, a discussion needs to be added regarding state requirements for coordination, consultation, and/or permitting. The AFB document states that 15 state-listed species have the potential to occur in the study area. Evaluation of potential adverse effects to these species needs to be included in the AFB documentation. Also, note that Table 2-1 only lists 14 state T&E species.

RESPONSE: A Biological Assessment (BA) will be written addressing the Bald Eagle. Through preliminary consultation with the FWS, no Bald Eagle nests are located with the project area and no impacts are anticipated. The BA, when completed, will be coordinated with the FWS for concurrence and full ESA coordination will be documented.

The discrepancy in the number of State T&E species was corrected. Table 2-1 and the description were corrected to correspond. The State T&E list will be included and addressed in the EA.

DISCUSSION: No effects statement should be included in the report.

REQUIRED ACTION: The District will provide the information and make the revisions in the draft report, as requested.

ACTION: See Appendix B.

HQ ANALYSIS: The report indicates that the district wrote a Biological Assessment for the federally-listed bald eagle, found in Appendix B. Appendix B did not contain a Biological Assessment. The report also indicates that the district concluded that the project would not affect the bald eagle and this was discussed and coordinated with the USFWS. However, the report does not indicate whether the USFWS agreed with the district's conclusions. Did the district receive a letter from the USFWS stating they concurred with the determination of not likely to adversely affect? This usually comes separately from the Fish and Wildlife Coordination Act Report (CAR). If not, the district should verify this concurrence in the draft CAR when received.

RESPONSE: The District did not determine that the actions would not likely affect the bald eagle; the District determined that the action would not affect T&E species. This reference under the ESA portion of the environmental compliance section and the FONSI was changed to document "would not affect" instead of "would not likely affect". Since it was a "would not affect" determination, Section 7 does not require the Service to agree with the agency if the agency determines that the action would not affect a species. The biological assessment referred to in the appendix and in Chapter 5 was not a biological assessment conducted under formal section 7 consultation, but rather a biological evaluation to determine that formal consultation was not needed. The terminology in the report was changed to biological evaluation and the evaluation was incorporated into the EA as a whole, and was not therefore attached as an appendix. Most times this is done informally with the Service; however, the Clear Lake Ecological Services Office requests this process from the Corps on every project. This office also doesn't concur with an agency unless a biological opinion is issued. Therefore, there will be no letter nor will it be addressed in the Final CAR. However, they do state in the draft CAR that the Corps has determined and they do not disagree with us, or suggest anything additional in their recommendations.

HQ ANALYSIS: Resolved

38) State historic preservation officer (SHPO) coordination.

COMMENT: Page 1-2 indicates that coordination with the SHPO has occurred. Has a letter been sent to SHPO? If so, what was the content of our letter? The document needs to state the results of all coordination efforts and the views of SHPO, including responses to our letter if sent. This information needs to be provided at the AFB and included in the draft feasibility report.

RESPONSE: All SHPO coordination will be documented in the EA.

DISCUSSION: The District provided an update. Nothing significant was found in the records search. Additional field work will be performed by contract, which will be in place shortly. No letter has been sent to SHPO yet.

REQUIRED ACTION: The District will ensure coordination with SHPO and will document the coordination in the draft report and EA, as requested.

ACTION: See Appendix C, which contains a draft Programmatic Agreement to be used for both Onion Creek and Wharton.

HQ ANALYSIS: The "Required Action" in the PGM was that the district "will ensure coordination with SHPO and will document the coordination in the draft report and EA." The "Action" taken was to include a draft Programmatic Agreement to be used for Onion and Wharton projects. This does not indicate that the district has indeed coordinated with SHPO yet. Correspondence in Appendix H shows the district contacted Native American Tribes, but HQ does not see a letter to SHPO. Sending SHPO a copy of the draft report is not sufficient. The district needs to immediately began individual agency coordination with SHPO, or else provide HQ with the information necessary to show coordination has begun. Coordination with and feedback from SHPO is imperative by this point.

RESPONSE: Coordination is underway with SHPO and was conducted outside of sending the draft report. Feedback from SHPO has been received and the District has modified the draft PA per SHPO's request and has sent it back to SHPO and is awaiting concurrence on the plan. The District has documented this coordination by including the discussion and including the letter documentation within the final Report.

HQ ANALYSIS: Resolved

39) Public involvement.

COMMENT: The AFB documentation simply states that public workshops and Wharton City Council briefings have been conducted to keep officials and interested citizens informed. The documentation needs to list all meetings with the interested public, and even more importantly discuss the key issues and concerns raised and how the district has/will consider the issues and concerns, and how they impact the formulation and decision-making process. This information needs to be provided at the AFB and included in the draft feasibility report. Also see comment concerning Environmental Justice

RESPONSE: The draft report will contain a discussion of the public involvement process.

DISCUSSION: A brief overview of the public involvement to date was provided by the PM. It was noted that the public is very supportive of the project, which has a potential to take virtually the entire town out of the floodplain.

REQUIRED ACTION: The District will provide the information in the draft report, as requested.

ACTION: See Chapter 6, Public Involvement.

HQ ANALYSIS: The draft report was improved by inclusion of Chapter 6. The final report needs to include a thorough discussion of public input/feedback that was obtained during scoping as well as review of the draft report.

RESPONSE: Concur, The final report was revised to include public input/feedback as a result of the public meetings and draft report public comment period. No comments were received from the public regarding the Wharton Project.

HQ ANALYSIS: Resolved

40) Compliance with other statutes, regulations, and executive orders.

COMMENT: A section needs to be added that lists other requirements applicable to civil works projects and states what actions we have taken or will be taking to comply. Examples include the ESA, FWCA, National Historic Preservation Act, Migratory Bird Treaty Act and EO, Farmland Protection Policy Act, Environmental Justice EO, Floodplain Management EO, etc... Please reference ER 1105-2-100, Exhibit G-8, page G-47. This information needs to be provided at the AFB and included in the draft feasibility report.

RESPONSE: Concur. The PDT, in concert with the FWS team member, has strived to address all applicable statues, regulations, and executive orders. The draft report/EA will include a section that lists requirements applicable to this project, and it will document actions that were taken to assure compliance.

DISCUSSION: No further discussion.

REQUIRED ACTION: The District will provide the information in the draft report, as requested.

ACTION: See Environmental Compliance Section, starting on page 5-18.

HQ ANALYSIS: The draft report does include this section. HQ provides the following comments on the new section:

(1) Under "Endangered Species Act"(ESA)(pg. 5-18) the district mentions a Fish and Wildlife Coordination Act (FWCA) report (a CAR). This should be mentioned under a separate "FWCA" heading, as the FWCA and ESA are two separate legal requirements.

(2) Table 5-6 (pg. 5-21) inappropriately indicates full compliance with the following statutes:

a) FWCA. Full compliance will only be attained when a final CAR is received.

b) Clean Water Act. Since 401 Water Quality Certification has not yet been received from the State, full compliance with CWA has not been yet achieved.

c) National Historic Preservation Act. Full compliance has not been achieved as coordination with and input by SHPO has not occurred.

d) NEPA. Is not fully complied with as this is a draft report/EA. The final report should show full compliance only when applicable. If, for instance, a final CAR is not received for inclusion in the final, this table needs to indicate "pending," and discuss when fulfillment of legal requirements will be met.

RESPONSE: Concur; however, full compliance is anticipated for the final report. The ESA section was corrected on page 5-22 and a FWCA section was added on the same page.

HQ ANALYSIS: Resolved

41) Environmental justice.

COMMENT: The whole paragraph on EJ (page 2-13 in *Existing Conditions*), with the exception of the last sentence, just discusses what EJ and EO 12898 are. The last sentence indicates that something should be done to determine potential impacts to minority and/or low income populations within the study area. It is essential that the district describe its earnest efforts to determine the presence of any population covered by EO 12898 in the area directly or indirectly affected by the project. Minority and low-income populations should have been identified at the beginning of the study process and these populations, once identified, should have been located and their participation in scoping actively pursued. The document must describe outreach efforts to involve and consider the needs of these populations in the planning process. If this has not been accomplished yet by the district, it is imperative that they begin this action immediately. A draft document should not be released if we have not yet identified and sought input from minority and low-income populations.

RESPONSE: Concur.

DISCUSSION: As expressed in the comment, HQ is placing major importance on EO 12898. They indicated that the findings must be included in the PGM, and as such, is presented below:

The US Census Bureau divides the city of Wharton into 4 census tracts. All tracts have high concentrations of ethnic and racial minorities. The Hispanic population of Wharton makes up the largest minority population of the city. 31% of the population of Wharton claims some type of Hispanic descent; many are from

multiracial backgrounds. Hispanic residents are distributed fairly evenly across the census tracts that make up the city. African Americans make up about 25% of the city population, but that population is not as evenly distributed across the city. The highest concentration of African Americans in Wharton is in the southern section of the city. This is the lowest income area for all census tract residents and is subject to frequent flooding from the Colorado River.

Frequent flooding is a problem in all tracts. Each tract is expected to benefits from the planned flood control project that meets NED standards. There are no buyouts planned for recreation, nor are structures being acquired in order to build any of the proposed project components. Since no businesses or homes will be removed, there will be no adverse socio-economic effects on any minority present in the city of Wharton.

REQUIRED ACTION: The District will provide the information above in the draft report, as requested.

ACTION: See Environmental Justice section, starting on page 5-19.

HQ ANALYSIS: Resolved

42) Alternatives impact assessments.

COMMENT: NEPA requires consideration and documentation of direct, indirect, and cumulative effects. Additionally, temporary as well as permanent impacts must be documented - such as air quality, noise and public safety issues related to increased traffic on local roads due to project construction. The alternatives discussed in Chapter 4 do not include evaluation of indirect, cumulative, and temporary impacts and only cursory information is provided on direct impacts.

For example, on page 4-17 it states that the proposed action "will impact approximately 2.3 acres of waters of the U.S." How was this impact determined when no information is presented in the *Existing Conditions* section on the amount, location, or types of waters of the U.S. in the project area? "Waters of the U.S." is a broad description. All it tells the reader is that it is not upland. What habitat type(s) is (are) being impacted? What are the functions and values lost? Additionally, it states that "Baughman Slough exhibits low habitat value and water quality features." What is the basis for this statement? What about impacts to cultural resources that the district determined have a high probability of occurring along Baughman Slough? Impacts associated with each alternative and action needs to be documented for all relevant resources.

As stated previously, the *Existing Conditions* section needs to describe the quality and quantity of resources in the project area. Ecological resources must be evaluated using a habitat-based methodology (ER 1105-2-100, section C-3(d)(5), page C-15). This evaluation is critical to determine mitigation requirements.

Additionally, for every alternative evaluated, all temporary, indirect and cumulative impacts must be documented. What are potential indirect and cumulative effects of providing flood control to presently undeveloped land? With project implementation, it is foreseeable that development may occur in the future in areas that presently would not be suitable. What are the potential impacts on natural resources in the area, such bottomland hardwoods and special aquatic sites? Determination of all impacts associated with the alternatives formulated needs to be provided at the AFB. Also, preliminary results from habitat evaluations should be presented at the AFB.

RESPONSE: Evaluations considered adequate for use in formulation were indeed performed. Additional information will be made available at the AFB.

DISCUSSION: HQ indicated the need to see this information prior to release of the draft report. Impacts to the different resources, as well as the human environment should be addressed. The following information is provided as a response to HQ, and will be included in the formulation chapter of the draft report, under the appropriate subtitles:

No action alterative: The no action alternative would not result in impacts to fish and wildlife habitat within the project area. This alternative may result in temporary water quality impacts to surface and ground water due to over bank flooding. An out-of-bank flood of the Colorado River would impact the water treatment plant, located on the river bank, and any septic systems in the city which could lead to a temporary discharges of sewage. Overall, this alternative would not result in any additional environmental impacts compared to the current conditions.

This alternative will continue to subject Wharton citizens to flooding hazards. The purpose of the proposed project is to alleviate flooding of the Colorado River and reduce flooding hazards and risks for the public. This alternative will not meet the purpose and need of the project.

Buyout alternative: The floodplain evacuation alternative would involve the relocation of 246 flood prone structures, 237 of them residential, from areas generally located along the Colorado River bank. These flood prone areas could then be restored as riparian habitat and have a positive environmental impact. However, displacement of the residents may cause additional development in other, less flood prone areas, and result in additional environmental impacts. The buyout alterative would reduce flooding hazards of the residents located in the most prone areas. Air quality and noise impacts due to relocation and restoration efforts will be similar to normal background levels within Wharton. This alternative would have some positive aspects, i.e. a reduction in flood hazards and the creation of additional riparian habitat, however, it does not address the complete flooding issues of the city of Wharton.

Colorado River Levees: The formulation team used several siting criteria for the placement of the levee: the placement on elevated ground to reduce the footprint of the levee, the avoidance of existing structures, and the avoidance of high quality habitat. The habitat along the Colorado River can be classified into three broad general categories: developed, pasture, and forested. The developed area is the area located in downtown Wharton. The levee would be constructed as a floodwall and located along an existing sidewalk and city park. No environmental impacts will occur in the developed area. The forested habitat occurs sporadically along the levee route. Approximately 15 acres of upland forested habitat would be permanently impacted by the proposed plan. Impacts to the forested habitat would be compensated for in the mitigation plan. The remaining areas are categorized as cleared pasture for cattle grazing. The proposed plan would have a temporary impact to pastures during construction but would be restored to pre-construction use when the project is complete. The proposed plan will also cross seven tributaries, which would involve culvert structures. Noise and air quality impacts would be temporary, occurring only during construction activities. Noise and air quality impacts are projected to be similar to normal background levels within the city of Wharton. Overall, the proposed Colorado River levee alternative will only result in permanent impacts to upland forested habitat and minor impacts to open water tributaries due to levee crossings and meeting the goals of the project purpose of reducing flooding hazards within the city.

Baughman Slough Levees & Channelization: The goal of the Baughman Slough Levee and Channelization is to reduce over bank flooding into the northern sections of Wharton. This alternative will reduce flooding hazards for the citizens in this area. The area surrounding Baughman Slough is cleared and used as pasture or residential yards. Approximately three acres of forested riparian habitat will be impacted by the proposed plan. The riparian habitat will be compensated for in the mitigation plan. The excavation portion of the plan will impact approximately 2.3 acres of waters of the U.S. Noise and air quality impacts would be temporary, occurring only during construction activities. Noise and air quality impacts are projected to be similar to background levels within the City of Wharton. The proposed alternative would result in minor impacts to the slough although the mitigation plan for the slough would enhance habitat and water quality functions in the area.

Hughes Street Drainage: The Hughes Street Drainage plan involves the installation of three 60-inch pipes to drain the Outfall Storage Area. A portion of the plan is located along Hughes Street within a residential area. No environmental impacts will occur in this area. South of Caney Street, the pipes will be located within an old meander of the Colorado River that lies between a residential area and an upland mound. An open cut ditch is located within the meander and runs approximately 2,200 feet to the outfall at the river. This alternative would utilize an existing drainage ditch and cleared right-of-way to reduce impacts to riparian areas.

Richmond Pipes: The Richmond Pipes plan involves the installation of three 60-inch pipes along existing roadways within residential and commercial areas of Wharton. The outfalls of the pipes are located within a small city park along the steep bank of the Colorado River. This alternative will result in no adverse environmental impacts.

Santa Fe Ditch: The Santa Fe Ditch plan involves an open cut ditch that runs along the abandoned Santa Fe railroad and then along Mundel Street to the outfall at the Colorado River. This alternative has cleared right-of-ways, which would limit impacts to the environment. The outfall will permanently impact some riparian areas. Overall, this alternative would have only minor environmental impacts.

REQUIRED ACTION: The District will provide the information in the draft report, as requested.

ACTION: Information contained in paragraphs above have been placed in the appropriate areas, and can be found on pages 4-4, 4-10, 4-14, 4-23, 4-28, and 4-30.

HQ ANALYSIS: The 17 August 2006 Documentation of Compliance with PGM, submitted to HQ with the draft report did not have the correct "Required Action" as was in the 28 June 2006 documentation of AFB PGM issued by HQUSACE. The correct "Required Action" is as follows: "The district's evaluation of "Impacts Associated with Alternatives" is still incomplete. The provided paragraphs that will be included in the draft report are good; however, impacts area evaluated for only a small set of social, economic, and environmental parameters. The district may reference the example "Impact Assessment Matrix" that was provided by Tulsa District in their ITR/Environmental Review. The matrix listed numerous social, economic, and natural and cultural resource parameters that should be included in an evaluation of impacts associated with each alternative. It may be that there are little to no impacts to some of these parameters. If this is the case, the district needs to state this and state why they believe this is so."

RESPONSE: The District included additional parameters that we felt were appropriate for an EA level assessment. The included Impact Assessment Matrix goes well beyond an EA level analysis and is more applicable for an EIS level. However, the District tried to incorporate much of the matrix within other associated parameters for the Recommended Plan in Chapter 5. These parameters included more of the other social effects such as public health and safety, public services, recreation and public access, and traffic. In addition, an environmental impacts section was added to each of the alternatives under the Detailed Investigation of Alternatives in Chapter 4. These are summary environmental analyses, as that was the level of detail that was analyzed during the feasibility level design.

HQ ANALYSIS: Resolved

B. REVIEW COMMENTS ON THE MARCH 2005 ALTERNATIVE FORMULATION BRIEFING PACKAGE FOR ONION CREEK.

43) Problem identification.

COMMENT: The district does a good job developing a clear and concise problem statement. However, additional information is needed in the chapter to further define the problems. The flooding problems have been developed further in this chapter by estimating expected annual damages and identifying the value of development in the floodplain. The damage numbers and number of structures do not agree with the numbers contained in the text. The district should add a discussion on the depth of flooding within the various flood zones associated with the flood risk. Where are the mobile homes located in the floodplain? What type of foundations are prevalent, slab on grade, crawlspace or basement. For the 100-year event, how many structures have first floor flooding? The Problem statement indicates a "lack of sufficient passive recreation facilities to meet the demands of the growing population. There is no documentation in the chapter that supports that claim. The district needs to further define the problem associated with recreation facilities.

RESPONSE: The district apologizes for the inconsistency. The tables were updated without making corresponding changes to the text. As shown by the numbers provided in the documentation tables, the majority of the mobile homes are in the Timber Creek and Yarrabee Bend areas of interest (economic reaches). In addition, despite the fact that mobile homes have a substantial floor correction, damages still start at a relatively small return interval, meaning they are usually among the lowest in the floodplain. The vast majority of the single family "stick built" homes are slab on grade, with only a very small percentage of older homes being pier on beam. There are virtually no basements in the area, or in state of Texas. The problem statement is derived from the finding of the recreation survey; additional summary documentation will be placed in the main draft report to support the problem statement.

REQUIRED ACTION: The District shall update text to correspond with the table. The information contained in the response will also be added into the draft report.

ACTION: A "Depth of Flooding" Section, with associated figures, was added to Chapter 3 in the draft report, beginning on page 3-5. In addition, the tables and text in this chapter were revised for consistency. The "Recreation Needs and Opportunities" Section, beginning on page 3-27 was revised to include a better description of the latent demand for recreation facilities. In addition, a significant amount of information was added in Chapter 2, beginning on page 2-18 regarding existing recreation facilities in the area.

HQ ANALYSIS: Resolved

44) Planning objectives.

COMMENT: It is not a planning objective of the Corps to "create a hydrologic model using HEC-HMS that can be utilized by the City of Austin for the Onion Creek basin with year 2010, 2060 and ultimate watershed development conditions". It may be the objective to create such a model to formulate and evaluate alternatives to address the water resources problems in the area. The district should modify this objective.

RESPONSE: Concur. This will be revised in the draft report.

REQUIRED ACTION: The objective identified in the comment above will be modified, as suggested, in the draft report.

ACTION: Item 9, in the "Planning Objectives" section of Chapter 4, page 4-3, was revised per the comment.

HQ ANALYSIS: Resolved

45) Existing conditions.

COMMENT: The report does not provide an adequate description of the extent of the flooding problem. There is not sufficient information to accurately describe the flooding problem.

ER 1105-2-100, Appendis E, page E-95 states:

"(a) Flooding. Describe the flood situation, including a designation of high hazard areas. The description should include characteristics of the flooding, such as depths, velocity, duration, and debris content; area flooded by floods of selected frequencies, including 100-year frequency [.01 annual probability]; historical floods, and, where applicable, larger floods. [Description of flood characteristics for a given frequency or discharge should be based on the median probability discharge. The regulatory floodplain as defined by the National Flood Insurance Program will always be described.]"

ER 1105-2-100, Appendix E, page E-112 further states:

"The summary tables should include pertinent land use data for computing not only NED benefits, but also environmental, social, and regional impacts. Also present other floodplain data pertinent to the evaluation on one or more maps: Flood limits and depths with and without the project; current and future land use; and 100-year [.01 annual probability] and other flood limits and depths."

Some of the information described above is provided, but the district should provide more detail, specifically dealing with the depth of flooding. Depth of flooding is very important in the plan formulation process especially for non-structural projects.

RESPONSE: Additional figures are being added to the Problem Identification Chapter, which provides information regarding depth of flooding for the 25- and 100-yr storm events in the identified areas of concern. Also, additional narrative documentation will also be added into the report.

REQUIRED ACTION: As per response above.

ACTION: A "Depth of Flooding" Section, with associated figures, was added to Chapter 3 in the draft report, beginning on page 3-5.

HQ ANALYSIS: Resolved

46) Onion Creek Forest FEMA mapping.

COMMENT: The document indicates that structures in the Onion Creek Forest reach were "constructed after the establishment of initial floodplain ordinances. This ordinance forced builders to set first floor elevations at essentially the same relation to the flood profile. Unfortunately, the initial floodplain determinations were grossly underestimated." The district needs to explain when the determination of the 100 year floodplain changed, why it changed, and by how much. Was it impacted by continued development in the basin?

RESPONSE: The change in the 100-year floodplain was primarily the result of significant hydrologic modeling inaccuracies associated with the original 1970's FIS effort, and not by ongoing development. The official FEMA maps were modified in mid 1990's, with the Base Flood Elevations increasing by as much as six feet. Words to that affect will be added to the report.

REQUIRED ACTION: The draft report shall include additional information as provided in the response above, regarding FEMA map inaccuracies.

ACTION: Information regarding the FEMA map inaccuracies was added in Chapter 4, on page 4-38.

HQ ANALYSIS: Resolved

47) Future without-project condition.

COMMENT: The submittal indicates that there would be significant amount of development in the future condition and because of this development the environmental and flooding issues would worsen. It is not clear how the future

condition is incorporated into the analysis. Explain the differences between the existing and future without-project conditions and how the differences would affect the plan formulation, evaluation, and selection. This issue is significant because adjusting the base condition to account for future conditions could conceivably lead to the selection of a different plan.

RESPONSE: The City of Austin has one of the most progressive stormwater and floodplain management programs in the Southwest. In general, they exceed the FEMA requirements. One aspect of this includes the provision that developers shall not increase the 100-year peak runoff from the parcel being developed. Increased imperviousness within the basin still results some overall volumetric increases, especially with the more frequent, non-damaging storm events (2-yr, 5-yr).

Given that increases in damaging level floodplains (greater than 10-yr) are not extensive, this evaluation uses the same formulation strategy as in previous studies of this general type. Benefits attributed to each alternative for comparison purposes are derived by subtraction of the residual damages from the existing damages. The same approach is also used to optimize the final alternative. This results in a determination of annualized benefits during formulation that is slightly lower than if both "base year" and "base year plus 50" would have been used. However, it has been our experience that in general, costs are also underestimated at this point in the process, and formulation/plan selection is typically not affected.

For the recommended plan, an updated economic analysis will be performed, which will utilize both "base year" and "base year plus 50" conditions. This will be compared against a complete, detailed MCASES cost estimate for the recommended plan. Use of this type of evaluation strategy results in a streamlined procedure that does not forgo accuracy.

AFB DISCUSSION: HQ's main concern is to ensure the documentation is consistent throughout the report in terms of discussing the hydrologic impacts and the environmental impacts for future without-project versus future with-project conditions. The District agreed to review the document and make changes in appropriate text to ensure that the correct terminology is utilized. The reviewer stated he had identified specific areas within the report that should be reviewed for inconsistency, which were supplied to the District for their reference.

REQUIRED ACTION: District shall review the document and make changes to ensure that the correct terminology is utilized regarding hydrologic impacts and the environmental impacts for future without-project versus future with-project conditions.

ACTION: The first paragraph of Chapter 4 was revised to address the assumptions made regarding existing versus future without-project conditions from a hydrologic standpoint. Subsequent discussions of "No Action" alternatives for the various areas of interest reiterated these assumptions. In addition, an "Updated Future

Without Project Conditions" section was added on page 4-22, specifically addressing the environmental future without-project conditions.

HQ ANALYSIS: Resolved

48) Structures and investment identified.

COMMENT: This section identifies the number of structures and the value of inventory in the flood plain. The text does not match referenced Tables 3-2 and 3-3. The text identifies 1,412 damageable structures within the 500-year flood plain of Onion Creek. Table 3-2 indicates that there are 1,083 structures in the flood plain of Onion Creek. The text identifies 431 damageable structures on Williamson Creek while Table 3-3 indicates there are 513 structures. The text states: "As shown, the total estimated value of the 500-year flood plain investment, including vehicles, is $268 Million, based on December 2001 prices and level of development". The referenced tables plus $24 Million in vehicle investment adds to $172 Million at 2004 price level. The district needs to make sure the discussion in the text and the tables are correct and do not contradict each other as well as assure that all benefits and costs are at the same price level.

RESPONSE: The District apologizes for the inconsistencies and inaccuracies. The tables were updated, but unfortunately corresponding updates to the narrative text were not performed. Benefits and costs being compared will be shown at the same price level in the draft report. The District does not believe this will affect the formulation results.

REQUIRED ACTION: The District shall ensure that the text discussions and data in Tables 3-2 and 3-3 are correct and consistent regarding benefits, costs, and price level.

ACTION: The referenced tables starting on page 3-7 (Tables 3-4 and 3-5 in the draft report), and the associated text, were revised in the draft report to ensure consistency.
In addition, all tables and text were reviewed for consistency throughout the document. This process revealed a spreadsheet error which affected the total first economic costs and ER costs shown in Table 4-15 of the AFB package (Table 4-24 in the Draft Report). This oversight necessitated a slight revision in the annual costs of the structural combined plan on Williamson Creek; however, this did not affect the formulation process or selection of the NED/NER Plan.

HQ ANALYSIS: Resolved

49) Alternatives considered.

COMMENT: Flood proofing alternatives have been ruled out early in the process seemingly based upon depth of flooding. It does not appear that flood proofing of

structures was considered in combination with other alternatives. Although it may be reasonable to exclude elevating or flood proofing structures because of the depth of flooding, the depth of flooding is not discussed sufficiently to eliminate flood proofing from consideration especially in combination with alternatives that may reduce the depth of flooding in areas. Depth is discussed as it relates to the 25-year floodplain. Alternatives were developed to address the flooding in the 25-year floodplain. Can flood proofing be a viable alternative for properties outside of the 25-year floodplain in combination with other alternatives that may help to reduce the residual damages? The district needs provide a more detailed explanation substantiating its removal from consideration or further develop this alternative. Further the diversion channel that was found to be cost effective was eliminated because it only reduced damages by 26 percent. Can the Diversion channel be combined with non structural alternatives to reduce its residual damages?

RESPONSE: The only area of concern that has possibilities for potential flood proofing is the Onion Creek Forest/Yarrabee Bend area. Given that a small diversion was found to be economically feasible, flood proofing could be considered in combination with diversion. However, the diversion reduced the 25-year average depth of flooding within this reach by only 1.4 feet, resulting in minimal increases to flood proofing potential when compared to standalone flood proofing. Depth of flooding would still be an issue.

Flood proofing combined with a 25-year buyout certainly may have possibilities from a theoretical view. However, the practicality of such a plan is believed to be fairly low. For example, residents have several hours lead time to find and properly install doorstops that would be used once every 50 years or so. This is further complicated by an aging neighborhood is becoming more transient, with many nonresident owners and tenants. The warning time would be better used to move contents higher, save small, non-replaceable keepsake items, and evacuate.

REQUIRED ACTION: The draft report will include the additional information contained in the above response, which clearly lays out why alternatives such as flood proofing in combination with the buyout were considered and/or eliminated, will be included in the draft report.

ACTION: The "Flood Proofing" section, beginning on page 4-11 in the draft report, was modified per the required action.

HQ ANALYSIS: Resolved

50) Recreation formulation.

COMMENT: The recreation formulation includes plan facilities that are not items that would be part of a cost shared plan. These include tennis courts, sports courts, disk golf, and volleyball courts. These items should be excluded from the NED

plan but can be included as a locally preferred option at 100 percent non Federal expense. See Exhibit E-2 in ER 1105-2-100.

RESPONSE: We will correct the cost apportionment by showing all non-cost shared items as a full non-federal expense. This will be appropriately documented in the draft report.

REQUIRED ACTION: As per the above response.

ACTION: The "Identification of the NED/NER Plan" section, beginning on page 4-62, provides an explanation for removal of the identified recreation features. This section, and subsequent sections, then provides a comparison of the economic analyses, total costs and cost apportionment for the NED/NER Plan and the Recommended (Locally Preferred) Plan. In addition, Chapter 5 provides updated comparisons between the NED/NER Plan and the Recommended Plan, based on the inclusion of these recreation features as part of only the Recommended Plan.

HQ ANALYSIS: Resolved

51) Recreation evaluation.

COMMENT: The contingent value method is a viable method to determine recreation benefits. The method typically will result in an annual willingness to pay that is dependent upon the existing supply of recreation alternatives and a detail plan of what would be developed. Another way to use contingent value is to estimate a day use willingness to pay. This method requires additional analysis similar to using the Unit Day Value (UDV) method. From the discussion in the report most of the required information was obtained through the survey mechanism that was approved by the Office of Management and Budget. Capacity estimates were provided by the county. More information on the method of calculating the capacity estimates needs to be incorporated into the report. Also the report should identify that the willingness to pay data collected from the survey is based on the planned location of the recreation facilities such that the individual willingness to pay may be impacted by the distance to the facility.

RESPONSE: Concur. Additional information regarding the computation of capacity estimates will be incorporated into the draft report.

It should be noted that use of the CVM does not specifically use any parameters related to distance. CVM is a value calculated based purely on statement of preferences for usage of a specific item, or change in the amount of the item. "The information scenario is not a marketing or sales pitch, but a neutral and fair description of the item to be valued..." Reference: A Primer on Nonmarket Valuation, Contingent Valuation in Practice, Kevin Boyle, Kluwer Academic Publishing, 2003.

AFB DISCUSSION: HQ indicated that additional information needs to be included regarding contingent value methodology, as it is not clear in the PGM documentation. The District indicated that the survey responses were spread and sorted by zip code, and that this information will be added to the report. Discussion continued regarding how the contingent value method in conjunction with the survey pertains to geography based on a perceived proximity by the respondents. The District agreed that this was a technical question and would add supplemental information, including coordination efforts with ERDC and IWR. As agreed, the information was provided to HQ prior to the PGM being completed, and is also included in the paragraphs below:

Stuart Davis of IWR was consulted during the time of survey development. Wen Chang of ERDC was also consulted at that time. In response to the reviewer's specific questions regarding the recreation analysis, the District also contacted Scott Jackson of ERDC. Mr. Jackson stated that Contingent Value Method (CVM) is one of three generally accepted recreation valuation methodologies, with Travel Cost and Unit Day Value being the other two. The CVM does not require origin-destination information to conduct the analysis. Mr. Jackson also suggested Mr. Bruce Carlson as a source that would confirm this position.

The following are responses to the reviewer's comments:

COMMENT: The contingent value from this survey can only be applied to the population that is within 5 miles of the proposed project.

RESPONSE: Our initial dialog with Mr. Davis indicated that distance has no bearing on the values used in the CVM, and therefore, the derived values should be applicable across the entire county.

COMMENT: The main report implies that this contingent value was applied to the entire population of the county. If this is true it will not accurately estimate the total annual value of recreation. If only the population within 5 miles of the proposed project was used the main report needs some rewording to clarify.

RESPONSE: Only the population within the five mile radius was used to count the number of visits to the proposed recreation. Demand from outside the five miles was not included. Values and demand remain constant across the entire county.

COMMENT: Did the demand analysis only look at demand from the population within 5 miles of the project site?

RESPONSE: The demand for the park came entirely from within the five mile radius. The analysis only took into consideration the current demand from households in that five mile radius. It should be noted here that population growth

was NOT taken into consideration over the life of the project. Therefore, the analysis most likely underestimates total demand across the project life.

REQUIRED ACTION: More information (as provided in the responses above) on the method of calculating the capacity estimates, shall to be incorporated into the draft report. Also the report shall identify that the willingness to pay data collected from the survey is based on the planned location of the recreation facilities such that the individual willingness to pay may be impacted by the distance to the facility.

ACTION: The following sentence was added to the fourth paragraph of the "Recreation Benefits Methods" section, beginning on page 4-7: "Even though the CVM does not require origin destination, only the population within the five-mile radius of the proposed projects will be used to count the number of visits to proposed recreation facilities if they are evaluated."

HQ ANALYSIS: Resolved.

52) Buyout benefits.

COMMENT: Section 219a of the Water Resources Development Act 1999 indicates that benefits for buyouts should be calculated in a similar manner to structural alternatives. It further states that in carrying out this directive, the Corps should avoid double counting of benefits. To avoid this double counting, adjustments need to be made to the real estate cost used in the benefit-cost calculation through the use of comparable flood-free land costs in the valuation of floodplain land. Cost information developed by Real Estate personnel during the feasibility study should be used for this calculation. See CECW-PD memorandum for Commanders, Major Subordinate Commands and District Commands, dated 22 January 2001, Subject: "*Implementation Guidance for Section 219 of the Water Resources Development Act of 1999, Nonstructural Flood Control Projects.*"

RESPONSE: This issue was originally identified and discussed as part of the Feasibility Scoping Meeting held on August 20, 2003. The minutes of the FSM contained this response:

"To date, no significant difference in value has been noted between flood prone and non-flood prone properties. Observations made during the field trip seemed to confirm this. Discussion at the FSM hinted that this may be the result of unique conditions associated with the local market, i.e. the flooding potential is offset by the lure of the creek. The District Real Estate Staff will conduct a reconnaissance appraisal of the areas of interest to validate this market behavior."

As agreed, the District Real Estate Staff conducted a Reconnaissance Appraisal of the areas of interest, which was completed in January 2004. The Appraisal confirmed the original assumptions and observations made during the FSM field trip. This finding will be documented in the draft report.

AFB DISCUSSION: The District indicated that Real Estate had completed a formal study evaluation and found this to be the case. HQ would consider this concern resolved once that information was added to the report and to the discussion in the PGM. The report is attached to the end of this documentation.

REQUIRED ACTION: The formal real estate study will be documented in the draft report.

ACTION: The real estate study, as provided by the District as part of the draft PGM document, was added in the draft report as Addendum 1 of Appendix E, Real Estate. A reference to the document was added on page 4-12, in the "Floodplain Evacuation" section.

HQ ANALYSIS: Resolved

53) Plan optimization.

COMMENT: Optimization has been accomplished for the buyout alternatives by comparing a 25-year buyout with a 100-year buyout. This increment appears to be too large of an increment for optimization. The district should compare a buyout of a smaller increment such as the 50-year floodplain.

RESPONSE: The 100-year buyout plan served a twofold purpose. First, it was a plan of high local interest; the sponsor's floodplain management goal centers around 100-year levels. Second, this plan would provide the downward breakpoint needed to complete optimization. Experience with previous floodplain evacuation projects has shown that a 25-year level is generally the highest optimal level to be expected. However, continuing annual reductions in the Federal interest rate is causing plans to possibly optimize at a higher level. During the time of formulation, the potential for a 50-year NED plan was investigated using several distinguishing metrics. For example, the additional increment of 145 structures (approximate) would cost about $20 million ($1.2 million annualized) with a return of about $250,000 annually. This is an incremental BCR of about 0.2, for flood damage reduction only, meaning recreation benefits would have to support 80% of the costs for the increment to be favorable. The team decided that this was not a reasonable expectation, and thus did perform a full evaluation of a 50-year plan.

AFB DISCUSSION: HQ concurred that the rationale provided above is adequate.

REQUIRED ACTION: The information provide in the response will be included in the draft report.

ACTION: The information in the response above was added to the formulation discussion for Onion Creek Forest/Yarrabee Bend, beginning on page 4-37. Additional information regarding elimination of higher level alternatives was also added to the Timber Creek discussion on page 4-31.

HQ ANALYSIS: Resolved

54) Basis, effectiveness and sustainability.

COMMENT:

Basis: HQUSACE requests an explanation of the basis for the proposed ecosystem restoration measures discussed in the report. The formulation process for ecosystem restoration measures consists of evaluating several different scales of tree, shrub and grass plantings along riparian corridors in the various damage areas. It is not clear how this type of measure is responsive to the current and future environmental stressors cited throughout the report, including declining water quality, increasing scour and sedimentation, increased impervious surfaces in the watershed, increased water-borne nutrients, loss and fragmentation of riparian habitat caused by development, the loss of riffle and pool stream structure caused by high water flows, and the widening of stream channels caused by increased high flows. The overarching cause of the environmental degradation is highlighted in item 2 of the Development of Problem Statement on page 3-10 of the report;
2. Degradation of the environment, fueled primarily by urbanization and development pressure.

While the planting of trees and other plants addresses the direct loss of riparian habitat, and might provide water quality benefits under certain conditions, it appears that no measures have been formulated to deal with the systemic problems adversely affecting the environment, as represented by the identified stressors. As stated in paragraph 6 of ER 1165-2-501, Corps of Engineers ecosystem restoration studies should involve a comprehensive examination of the problems contributing to system degradation, and the development of alternative means for their solution. It is not clear how the tree-planting measures proposed in this study are in compliance with this guidance. Related guidance concerning the importance of considering the larger environment is discussed EP 1165-2-502, paragraphs 7(e), Ecosystem Approach, and 7(f), System Context.

Effectiveness: HQUSACE requests further information concerning the effectiveness of the proposed ecosystem restoration measures as evaluated by the habitat suitability indexes (HSIs), as calculated using the Habitat Evaluation Procedures (HEP). Under HEP, the habitat suitability index is a gage used to evaluate the suitability of a habitat for a suite of animals known as a guild. An HSI of 1.0 is considered ideal habitat for the guild, while an HSI of 0.0 is considered to be without value to the guild. The calculated with-project HSIs for the various damage areas of the recommended plan fall in the range of 0.33 to 0.37, representing a habitat of less than average quality. While these HSI values are an improvement over the future without-project condition, additional information is needed to explain why the Federal investment in such relatively poor quality habitats is justified. While HQUSACE realizes that the proposed ecosystem

restoration component of the study represents a small percentage of the overall project costs, recent experience with reviewers at the OASA(CW) suggests that these costs and ecosystem outputs measures will be scrutinized closely.

Sustainability: The report should discuss the long-term sustainability of the proposed ecosystem restoration measures in light of the projected declines in the key environmental indicators resulting primarily from urban development. Most of the identified stressors do not appear to be considered or addressed in the ecosystem restoration formulation process. As stated in paragraph 7(c) of EP 1165-2-502, the goal of Corps ecosystem restoration efforts is to partially or fully reestablish the attributes of a naturalistic, functioning and self-regulating system. Also, as stated in paragraph 7(f) of EP 1165-2-502, Corps restoration projects should be conceived in such as way as to improve the long-term survival of self-sustaining, functioning aquatic ecosystems. The report should discuss how the measures proposed in the study are in compliance with the above sections of Corps ecosystem policy given that the majority of the identified environmental stressors would not be ameliorated by the proposed restoration measures, and are projected to get even worse in the future.

RESPONSE:

Basis: Williamson Creek has undergone extensive urbanization in the past; however, the stream has somewhat stabilized itself to where it is not eroding and is almost at full build out capacity in the middle and lower portions of the creek. There is room for expansion in the upper part of the watershed, but with City of Austin ordinances that have come into effect post early urbanization, there is not expected to be high increases in velocities in the creek because of the new development. In addition, to further limit impervious cover since the upper watershed is in the contributing zone of the Barton springs Segment of the Edwards Aquifer, it is highly regulated in terms of future impervious cover. There are a few instances where streambank stabilization could be performed to reduce sediment transport and improve water quality, but this was going to be proposed as part of the mitigation requirements that are just now being developed. With this being said, the existing degradation is primarily loss of fish and wildlife habitat from fragmentation and invasion of exotic species. The removal of these species and planting of native species would fill this void to the extent possible to make a riparian transportation corridor for fish and wildlife species.

Effectiveness: The district does not fully understand this comment, but we believe it was based on the lack of explanation of habitat suitability indices (HSI) values in the AFB package. The existing habitat quality in the form of HSI values was not displayed in the AFB package, but the Average Annual Habitat Unit (AAHU) was. This is where the .33 value is coming from. The future without project HSI values ranged from .38 to .65 HSI values on Williamson Creek for woodland habitat and .6 to .85 HSI on Onion Creek. With project conditions for woodlands ranged from .75 to .85 HSI on Williamson and .90 on Onion representing a high quality of restored

habitat. Future without project conditions on parkland habitat ranged from .38 to .51 HSI on Williamson and Onion and future with project restoration to woodlands from parklands reached .75 to .85 HSI. In instances on Williamson where restoration onsite combined with the structural flood damage reduction plan would be parkland restoration, the restored value would only reach .45 HSI because of the lack of understory that would be required for the HSI score to be higher. The draft report will be modified to include existing conditions, with and without project HSI values for each habitat type.

Sustainability: As stated in the basis response, the district believes that the environmental conditions have stabilized to where the restoration would be sustainable. There would be required O&M to keep the invasive species in check, but since the high disturbance in the project area is stabilized, the restoration should be sustainable once the native species get established and mature.

AFB DISCUSSION: HQ indicated the general responses were good but that it is very important to explain and translate the information very clearly within the report to prevent and minimize problems in the future. There are certain elements in the report that are not immediately apparent or as clear as they could be, and should be revised throughout. The report is the only thing reviewers have to depend on. HSI values of .85/9 in an urban area, as shown in the report, seem a bit abnormal; however, since HSI values are a technical issue, no policy comment was noted.

HQUSACE Policy staff subsequently provided a specific list of areas in the report where it was noted some revisions/clarifications should be made.

REQUIRED ACTION: The report will be revised as per the assumptions made, that future without-projects conditions, from a hydrologic standpoint, are not significantly different than existing conditions. In addition to the reviewer's specific comments, the entire report will be checked for consistency between H&H and Environmental write-ups.

ACTION: The first paragraph of Chapter 4 was revised to address the assumptions made regarding existing versus future without-project conditions from a hydrologic standpoint. Subsequent discussions of "No Action" alternatives for the various areas of interest reiterated these assumptions. In addition, an "Updated Future Without Project Conditions" section was added on page 4-22, specifically addressing the environmental future without-project conditions.

REQUIRED ACTION: The Problem Statement shall be revised to read: "The environment has been degraded from historical urbanization and development pressure. Although the creek has become mostly stable from a hydrologic and hydraulic standpoint and is not expected to significantly change in the future, there has been a substantial direct loss of riparian habitat."

ACTION: The problem statement, on page 3-28, was revised as follows: "The environment has been degraded from historical urbanization and development pressures. Although the creeks are working towards becoming stable from a hydrological and hydraulic standpoint, and is not expected to change significantly in the future; however, there has been a substantial direct loss of riparian habitat within the Onion and Williamson Creek Watersheds."

REQUIRED ACTION: In addition, the following additional problem statement shall be added: "Riparian habitat has been degraded from the proliferation of invasive species such as legustrum, Chinese Tallow, and Chinaberry."

ACTION: The statement was added on page 3-28, with the additional phrase: ".., which has resulted in less diversity within the Onion and Williamson Creek watersheds."

REQUIRED ACTION: The Timber Creek "No Action" alternative shall be revised to state the following:

"The population within the Onion Creek Watershed is growing at a rapid rate. This growth would add to impervious cover within the watershed, which in turn would increase the potential for increased flood damages downstream of the new development. From a hydrologic standpoint, this impact is significantly reduced by the city of Austin's Watershed Protection Ordinances, which prohibit any increase in the peak 100-year discharge from the area being developed. However, direct loss of habitat would continue throughout the watershed as vegetation is removed for construction. In addition to development in the upper watershed, the Austin-Bergstrom International Airport was opened, and SH-130 is under construction within the vicinity of the Timber Creek area. Therefore, commercial and residential developments are being constructed and planned for development in the near future, which would continue to affect habitat within the Timber Creek area. Furthermore, it would be expected that the construction activities would increase sediment load in runoff from soil disturbance. After completion, because of the lack of appropriate vegetative buffers and sediment ponds, the water quality of the creek would be affected by increases in impervious surface area, traffic, lawn fertilizer and other human activities due to increasing nutrient load and pollutant levels in the creek."

Even though one would expect Williamson Creek to become further degraded under the future without-project condition and the no action alternative, it is not likely that these degradations would cause the ecosystem restoration alternatives to be unsustainable. In fact, the ecosystem restoration alternatives would help offset some of these degradations.

ACTION: This information regarding Timber Creek was added in Chapter 4, beginning on page 4-30. Information regarding Williamson Creek was added on page 4-51, in the "No Action" alternative discussion.

REQUIRED ACTION: In addition to the above comment, HQUSACE review staff stated that the significance of the resource must be captured and documented well within the draft report. Information such as future environmental conditions, and significance of habitat restoration should be added to help explain why the environmental resources are deemed nationally significant. The district shall expand on that area in detail to include the three significance criteria and the budgetary information.

AFB DISCUSSION AND REQUIRED ACTION: The HQUSACE reviewer reminded the District of the memo from the OASA(CW), which stated that more specific and detailed information, especially regarding the baseline conditions and the benefits of developing a stable creek system, would enable a better review process. Specific information is helpful.

Additional information regarding the Significance Criteria is provided below:

SIGNIFICANCE OF PROJECT RESTORATION OUTPUTS

The significance of the recommended habitat restoration can be described in a number of ways including technical recognition (importance based on scientific knowledge or judgment of critical resource characteristics) in terms of scarcity, representativeness, status and trends, connectivity, critical habitat, and biodiversity; institutional recognition (importance of environmental resource is acknowledged in laws, adopted plans, and other policy statements of public agencies); or public recognition (segment of general public recognizes the importance of the environmental resource).

In addition, USACE assesses additional information on restoration projects for budgetary processes and ranking of importance of the outputs. These criteria are similar in nature and some are discussed at length included in the discussions of the three significance criteria above; however there are five budget criteria. These criteria include scarcity, connectivity, special status species, plan recognition, and self-sustaining. The scarcity criterion relates habitat to how nationally scarce the habitat is and if it is becoming scarcer as demonstrated by a Federal, regional, or state/Tribal report; or general scientific agreement as documented by professional publications/societies. Connectivity relates to habitat which makes a significant connection between existing habitat areas in a corridor or larger landscape contributing to reduction of population isolation, larger ranges, and population movement recognized by or demonstrated by community or species models. The special status species criterion requires that a restoration effort provide significant contribution to some key life requisite of a species. Plan recognition emphasizes restoration efforts that contribute to watershed or basin plans. The highest scores for this criterion are given to ecosystem restoration studies that contribute to a multi-agency comprehensive watershed plan developed in support of Federal priorities as demonstrated in laws or specifically authorized programs such as a recovery plan for an endangered species. The self-sustaining criterion emphasizes

the restoration of a self-sustaining ecosystem consisting of natural processes. A ratio of average annual Operation and Maintenance costs to the average annual total project cost will be used as justification.

Technical Recognition

From a technical recognition perspective, the recommended habitat is significant because it addresses habitat scarcity and diversity. Nationally, the loss of aquatic and riparian habitats is widely recognized. Freshwater animal species are disappearing five times faster than terrestrial animals, due (in part) to the widespread physical alteration of rivers (Ricciardi and Rasmussen 1999; NPS 2003). Of 860,000 river miles within the United States, approximately 24 percent have been impacted by channelization, impoundment, or navigation. The USFWS estimates 70-percent of the riparian habitats nationwide have been lost or altered, and 50-percent of all listed threatened or endangered species depend on rivers and streams for their continued existence. In some geographic areas, loss of natural riparian vegetation is as much as 95 percent – indicating that riparian areas are some of the most severely altered landscapes in the country (NRCS 2002). The National Research Council (NRC) has stated that restoration of riparian functions along America's water bodies should be a national goal (NRC 2002). Urban riparian buffers are the framework for healthy streams and water quality and provide greenways that improve the quality of life for citizens (Okay 2000).

Riparian forests, including bottomland hardwood forests, especially those occurring in the south, were designated as a nationally threatened ecosystem. There has been an 84% decline in riparian forests on a national scale since early settlement (Noss et al., 1995). The bottomland hardwood ecosystem in Texas prior to European settlement once extended over 6.5 million hectares; it is estimated that less than 40% of this original extent still remains (Frye, 1986), with only a few small and isolated patches of old growth scattered amongst the floodplains of the eastern third of the state. Losses of intact bottomland hardwoods in the past 50 years have at times been greater than 120,000 ha per year (Barry and Knoll, 1999). For the most part, factors such as urbanization, channelization, timber harvest, agriculture, and the introduction of exotic species have all contributed to the degradation and declining trend of riparian forests. Classification of the habitat types within the study area indicates that only percent of the area is riparian forest habitat. This number is very low considering that the study area is limited to the floodplain of Onion and Williamson Creeks. Specific measures such as riparian woodland development could directly serve to increase the acreage and improve the health of the riparian forest habitat located within the study area

Within the State of Texas, based on analysis of more than 21,000 plant and animal species, The Nature Conservancy's (TNC) Ranking America's Biodiversity (TNC 2002) within the 50 states and the District of Columbia show four states as having exceptional levels of biodiversity, with Texas ranked 2nd overall, but ranked 1st for diversity of birds and reptiles. Unfortunately, Texas ranks 4th in the number of extinctions, and is ranked 11th overall for species at risk. Following is a listing of

Texas rankings (out of 51) for the percentage of species at risk. Those listings in bold type are significant to the recommended ecosystem restoration of Onion Creek.

Bird Diversity at Risk	**6th**
Amphibian Diversity at Risk	7th
Freshwater Fish Diversity at Risk	8th
Mammal Diversity at Risk	9th
Reptile Diversity at Risk	9th
Vascular Plant Diversity at Risk	**11th**

The national and state trend for habitat loss is evident in the Austin area. The Onion Creek Watershed has an estimated 6.6 impervious cover and is expected to grow to 18.1 percent. Williamson Creek is even more built out with impervious cover estimated at 21 percent and future at 31 percent. Further, the introduction of exotic plant and animal species has had a substantial effect on riparian areas, leading to displacement of native species and the subsequent alteration of ecosystem properties (NRC 2002). Problematic non-native woody and herbaceous plant species are found throughout the project area. Local elimination of these species has been recommended by the USFWS and TPWD. This trend in the loss of habitat and species is expected to continue unless proactive restoration measures are taken. The state of Texas is projected to have a 59.8 percent increase in population by 2030. Between 2000 and 2030 the Travis County population is projected to grow up to 58.6 percent. Of all the attributes of natural land in central Texas, wildlife habitat is the most endangered by human growth pressures.

Migratory birds are of great ecological value and contribute immensely to biological diversity. Travis County provides essential feeding and resting habitat for migratory bird species and is in the "central-flyway" for migrating birds. Over 300 species of birds are listed as Nearctic-Neotropical migrants in North America, and over 98% of those have been recorded in Texas. Meaning of the more than 600 species of birds documented in Texas, 54% of them are neotropical species which depend on Texas to provide habitat for nesting or migration, and many of those are dependent on south central Texas riparian areas specifically (Appendix B, Enclosure 4). Neotropical migratory birds have been declining in numbers for several decades. Initially, the focus of conservation for this important group of birds was focused on breeding habitat and wintering grounds; however, recently it has been recognized that the loss, fragmentation, and degradation of stop-over habitat is potentially the greatest threat to the survival and conservation of neotropical birds (Smithsonian Migratory Bird Center). In arid areas of the United States, stop-over sites are restricted to small defined habitats along shelter belts, hedgerows, desert oases and riparian corridors. The riparian corridors of central Texas provide an opportunity for the birds to replenish fat reserves, provide shelter from predators and water for re-hydration prior to continuing, what is for most neotropicals, a trip of over 1000 miles one-way. During the fall migration, the Austin area is located towards the end of the long flight, and therefore, provides the vital link between having enough fat reserves to complete the trip or perish.

Desirable habitat for migratory waterfowl and neotropical migrants is limited in the Austin area. However, the project area is centrally located around areas where migratory birds are heavily concentrated, Hornsby Bend Wastewater Treatment Plant and McKinney Falls State Park, as well as the Williamson and Onion Creek Greenbelts. Hornsby Bend is the most popular birding area in the city of Austin and has a bird list of over 370 species (Personal Communications with Kevin Anderson 2006). Over 224 species of birds have been documented at McKinney Falls State Park (Kutac and Caran 1994). These areas have recorded a large number of neotropical migrant species and represent the other heavily birded locations in Travis County. The Onion Creek Project, centrally located around these two preferred migratory bird habitats, would increase the amount of highly used, but scarce habitat along a proven migratory bird stop-over corridor.

The Barton Springs salamander was listed by the U.S. Fish and Wildlife Service as an endangered species in 1997 primarily due to threats from degradation of water quality and quantity as a result of urban expansion over the watershed. According to the Barton Springs Salamander Recovery Plan, improving water quality and quantity to Barton Springs is of high importance for this listed species. Since it is well documented that expanding the riparian zone improves water quality by reducing scour and erosion and sediment transport and acting as a buffer zone to filter pollutants and some of the projects would be above or in the recharge zone, habitat for the Barton Springs salamander would be improved. However, these benefits cannot be quantified without significant groundwater studies. Projects that improve water quality or allow for more water to infiltrate the ground and are located in the contributing zone or recharge zone would all benefit the Barton Springs salamander and all species located within the Barton Springs.

The identified plan makes a significant contribution to a larger watershed conservation and restoration effort being implemented by the City of Austin, City of Sunset Valley, and Travis County. The above entities have made commitments to improving habitat across the entire Onion Creek and Colorado River Watersheds. The following is a brief listing for some of the recent, current, ongoing, and future projects for the watershed.

- Lower Colorado River Basin Study: This ongoing study, of which the Onion Creek Study is a part of, identified ecosystem restoration measures that the Federal government could possibly participate in as part of a lower Colorado River basin watershed scale plan. The Lower Colorado River Authority, City of Austin, City of Sunset Valley, Travis County, Texas Parks and Wildlife, and U.S. Fish and Wildlife Service all participate in public workshops to develop restoration measures.
- Austin Areas Lakes Ecosystem Restoration Study -- partnership study between the City of Austin and USACE to identify ecosystem restoration opportunities within Town Lake and Lake Austin to restore aquatic habitat within and around the two lakes.

- City of Austin's parks program: has already spent many millions of dollars to buy and preserve the riparian zone of Onion and Williamson Creeks.
- City of Austin's Barton Springs Clean Drinking Water May 1998 Proposition 2: Provides for funding to purchase lands located in the Edwards Aquifer recharge zone, including creeks, to prevent future imperious cover and for wildlife habitat. Approximately 10,053 acres have already been purchased in fee simple or conservation easement in Onion Creek. Some of the major purchases include the Rutherford Ranch (1739 Acres), Hays County Ranch (1325 acres), Nester (510), Ashmun (862 acres), and (Storm (1251 acres).

The restored habitat along Onion and Williamson Creeks from the identified plan would contribute to and benefit from the goals of the various projects listed above. As part of the larger watershed plan, the identified restoration project provides significant watershed level outputs that will contribute to sustainability, connectivity, biodiversity, and completeness of the ecosystem.

Institutional Recognition

The importance of migratory non-game birds to the nation is embodied in numerous laws, executive orders, and partnerships. The Fish and Wildlife Conservation Act demonstrates the Federal commitment to conservation of non-game species. Amendments to the Act adopted in 1988 and 1989 direct the Secretary to undertake activities to research and conserve migratory non-game birds. Executive Order 13112 directs Federal agencies to promote the conservation of migratory bird populations, including restoring and enhancing habitat. The Birds of Conservation Concern is a list maintained by the USFWS. The list helps fulfill a primary goal of the USFWS to conserve avian diversity in North America. Additionally, the USFWS' Migratory Bird Plan is a draft strategic plan to strengthen and guide the agency's Migratory Bird Program. The proposed ecosystem restoration would contribute directly to the U.S. Fish and Wildlife Service Migratory Bird Program goals to protect, conserve, and restore migratory bird habitats to ensure long-term sustainability of all migratory bird populations. Range wide protection, restoration and enhancement of terrestrial and aquatic habitats and landscapes are crucial to maintain and conserve migratory birds. The USFWS has divided North America into 37 regions known as Bird Conservation Regions (BCRs). Using Figure M, as well as consultation with USFWS, it was determined that the project area for this study lies within BCR 20 (Edwards Plateau). According to the list, there are twenty-one species (Table 20) in BCR 20 that are likely to become candidates for listing under the Endangered Species Act of 1973 without additional conservation actions. Of those 21 species, ten are known to occur in the riparian and floodplain habitats associated with the Onion Creek watershed. Included amongst these ten species are seven species that are of national concern due to their downward population status trends (USFWS 2002).

Table 4-1

Species Listed in Bird Conservation Region 20 according to USFWS *Birds of Conservation Concern 2002*; those Known to Occur in Onion Creek Riparian Habitats, and those of National Concern.

Species	Species Known to Occur in Onion Creek Riparian Areas	Species of National Concern
Bell's Vireo*	X	X
Buff-breasted Sandpiper		
Cassin's Sparrow		
Chestnut-collared Longspur		
Elf Owl		
Field Sparrow		
Gray Vireo		
Harris's Sparrow		
Kentucky Warbler	X	X
Ladder-backed Woodpecker	X	
Le Conte's Sparrow	X	X
Loggerhead Shrike*	X	X
McCown's Longspur		
Mountain Plover		
Orchard Oriole	X	
Painted Bunting*	X	X
Peregrine Falcon	X	X
Prothonotary Warbler	X	X
Rufous-crowned Sparrow	X	
Sprague's Pipit		
Varied Bunting		

* *Note* - species that met the rigorous criteria for statistically significant (P< or= 0.1, N>or =100), long-term (1966-2000) populations declines of > or = to 2.5 percent annually, both in the United States and survey-wide, using breeding bird survey data.

The ecosystem restoration measures identified for possible alternative selection, including riparian woodland conversion could serve to improve the riparian and floodplain habitats within the study area. This could benefit those species listed within in the BCC 2002 and known to occur in the Onion Creek watershed. Based on this information, it is clearly evident that ecosystem outputs gained from the proposed alternatives are significant at the institutional level.

The Department of Defense has signed a Memorandum of Understanding with Partners in Flight, a cooperative effort involving partnerships among federal, state,

and local government agencies, philanthropic foundations, professional organizations, conservation groups, industry, the academic community, and private individuals. A major focus of Partners in Fight is for the conservation of neotropical migrants.

The United States has recognized the critical importance of this shared resource by ratifying international, bilateral conventions for the conservation of migratory birds. These migratory bird conventions impose substantive obligations on the U.S. for the conservation of migratory birds and their habitats, and through the Migratory Bird Treaty Act, the U.S. has implemented these migratory bird conventions with respect to the U.S. The Migratory Bird Treaty Act prohibits the taking, possessing, importing/exporting, selling, and transporting of any listed migratory bird, its parts, nest, or eggs. Included in the protection provided by this act are all North American diurnal birds of prey, except bald and golden eagles. The North American Waterfowl Management Plan (USFWS 1998), signed by the United States, Canada, and Mexico, lists wetlands, aquatic systems, grasslands, forests, and riparian areas as habitats critical to waterfowl. Between 1986 and 1997 over $1.5 billion was invested to secure, protect, restore, enhance and manage waterfowl priority landscapes in North America. Thirty-six Important Waterfowl Habitat Areas have been identified by the USFWS, three of which are represented within Texas, and include east Texas, the gulf coast, and the playa lakes region. Central Texas provides a critical link between the three priority waterfowl habitat areas. The USFWS states that conservation efforts should include national and regional planning for both migratory and endemic waterfowl species. Wood ducks, specifically mentioned in the North American Waterfowl Management Plan, are resident within the project area.

The city of Austin has established local institutional significance by adopting zoning ordinances requiring setbacks of 50-300 feet (Depending on the area) of the riparian buffer next to a creek be left intact and not altered. The ordinance illustrates that the City of Austin acknowledges that riverine ecosystems are valuable enough to preserve and protect. However, the ordinance has been in place a relatively short time; previous degradation has left the riparian ecosystems in a less than desirable state.

Public Recognition

In addition to the recommended plan significance to scarce habitats, migratory birds, endangered species, and institutional recognition, significant public recognition and tangible support are demonstrated in the importance of implementing the recommended plan. The riparian corridors within the city of Austin are publicly recognized as being significant resources. This is during public meetings attended by residents in the area, publicly stating that they do not want their creeks destroyed. In addition, the city has purchased a vast amount of land consisting of creeks and rivers and for the purposes of establishing greenbelts and parks. This was done by bond election, which further supports the citizens desire to protect these resources. In addition to riparian areas, the city has also purchased thousands of acres in the contributing zone of the Edwards Aquifer for the sole

purpose of restricting impervious cover and improving water quality in the Edwards Aquifer and Onion Creek.

Because Onion and Williamson Creeks contribute to the recharge of the Barton Springs/Edwards Aquifer, there have been several non-profit citizen based organizations that have developed in the Austin Area with missions to save and protect the unique habitat and aesthetic values that the Texas Hill Country has to offer. These groups include the Hill Country Conservancy and the Save our Springs Association.

The Hill Country Conservancy's mission is to ensure a healthy environment and economy in the Barton Springs Edwards Aquifer region by preserving open space and the rural heritage of the Texas Hill Country. Their goal is to conserve at least 50,000 acres of land, focusing on scenic vistas, providing recreational opportunities, protecting water quality and quantity, and preserving the area's rural heritage. If this goal is accomplished, the area's economic vitality will also be ensured because the Hill Country's vast open spaces and natural beauty are a primary reason people choose to live and work there. Separate studies published by Texas A&M University and the Greater Austin Chamber of Commerce reached the same conclusion: the region's future economic growth and prosperity are inextricably tied to the preservation of its natural environment. The Hill Country Conservancy seeks the advice of and works with landowners, conservation buyers and sellers, the real estate and business communities, and numerous agencies of local, state and federal governments. Together, they craft cutting-edge solutions to the complex challenges of preserving the economy and the environment.

The Save Our Springs Alliance's mission is to protect the Edwards Aquifer, its springs and contributing streams, and the natural and cultural heritage of its Hill Country watersheds, with special emphasis on the Barton Springs Edwards Aquifer. This is a very active environmental group in the Austin area that supports riparian restoration and protection.

Regarding sustainability and the relatively low maintenance costs, the recommended plan achieves both. Once the restoration measures are in place ecological succession will take over. The restoration project will require very little routine maintenance except for invasive species removal and occasional thinning of understory.

Budgetary Requirements

As described in the AFB Discussion, some information is not yet available on significance. Although these issues are described mostly in the paragraphs above, more work is needed. The District will expand on these criteria and will pursue further coordination with the reviewer, if desired. All current and future information will be included in the draft report.

ACTION: The information above was added in the "Importance of Restoration Outputs" section in Chapter 5, beginning on page 5-9.

HQ ANALYSIS: Resolved

55) Environmental compliance checklist, appendix F, page F-62.

COMMENT: The list of environmental compliance items on page F-62 is incomplete, and does not follow the guidance given in Table 3.4.3, page 111, of the Principle and Guidelines. The list should be revised to include all applicable Federal laws and Executive Orders, and a status update (such as completed, partially completed, not applicable, etc.) should be prepared in compliance with Exhibit G-5, ER 1105-2-100.

RESPONSE: Concur, the draft report will incorporate all public laws and executive orders and the status of compliance. Exhibit G-8 of ER 1105-2-100 dated 30 June 2004 provides a more up to date listing of Environmental Compliance laws and Executive orders and will be utilized as they are applicable. This is enclosed in the attached documentation.

REQUIRED ACTION: As per the response above.

ACTION: The applicable information, including Table 5-13, were included in Chapter 5, beginning on page 5-32.

HQ ANALYSIS: Resolved

56) Items to be addressed in AFB documentation (Exhibit G-5 of ER 1105-2-100).

COMMENT: The submitted AFB materials do not address items in Exhibit G-5;

- **Item 5, Status of environmental compliance actions, coordination and NEPA documentation.** An attachment to the transmittal memo states that this study will utilize an environmental assessment tiered off the January 2006 programmatic EIS for the Lower Colorado River; however, the status of the integrated EA is given only as "underway". Based on the short list of topics found on pages F-61 and F-62 of the report, it appears that substantial work is needed to complete the EA. HQUSACE requests that the status of the EA be clarified, and specifically asks that information concerning the status of the NEPA scoping process be included in the response to this comment.

- **Item 10, Status of applicable environmental compliance coordination activities, and resources agency views, if known.** The AFB report does not discuss the views of the Federal and State resource agencies, although page 1-1 of the report states that coordination has already taken place with a number of

agencies. While not a critical issue in the AFB stage, the views of the Federal and State resource agencies should be presented in the draft feasibility study.

RESPONSE: Item 5: Substantial work has been performed on the Integrated EA. However, it needs to be documented in the draft report. The Integrated Report will be tiered to the PEIS, but there will be a summary of findings documented in the EA. The PEIS is readily available on the SWF website and will be hyperlinked to the draft report. However, there is still work needed to address impacts of the recommended plan in the integrated EA. The NEPA scoping process is documented in the attached documentation and will be incorporated into the draft report.

Item 10: Concur; there has been extensive coordination with Texas Parks and Wildlife Department and U.S. Fish and Wildlife Service. We will have a draft Fish and Wildlife Coordination Act Report in the draft EA. SHPO has been coordinated with early on and asked for additional surveys which are currently being conducted and will be coordinated with SHPO. The project is also in the process of being coordinated with EPA and Texas Commission on Environmental Quality (TCEQ). The views of the resource agencies will be documented in the draft Integrated Report. In addition, we are in coordinating with the Federal Aviation Administration in compliance with Advisory Circular 150/5200-33.

REQUIRED ACTION: As per the response above.

ACTION: Chapter 6 of the draft report, "Public Involvement and Agency Coordination", includes the information requested.

HQ ANALYSIS: Resolved

57) Status of environmental justice determination.

COMMENT: HQUSACE requests information concerning the District's determination of applicability of Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations. The reason we are requesting this determination is because the USEPA implementation guidance specifically states that coordination and outreach measures should be put in place as early as possible in the planning process in order to ensure that the views of any potentially affected communities are incorporated into the planning effort. HQUSACE believes that should any such coordination and outreach be required for this study, it should begin as soon as possible in order to avoid any potential delays down the line. Of course, should the District determine that the executive order is not applicable to this study; no such coordination/outreach measures will be needed.

RESPONSE: See attached additional data on Environmental Justice under the Environmental Compliance Section.

AFB DISCUSSION: The District stated that Environmental Justice was identified as a concern early in the study. Thus, the District conducted public outreach at the Public Meetings and with individual residents in the Timber Creek area of interest, which is primarily populated with low income residents. The primary concern the residents have is that they will not be able to obtain comparable land elsewhere. Structural alternatives were not only non-cost effective; they were only marginally successful in reducing the flood damage. The existing residents are located in the FEMA designated floodway. Currently, the only viable option is to offer relocation assistance. HQ indicated that a 1-2 page explanation should be included in the draft report, which documents the efforts of the public outreach. The District will expand and discuss this issue in detail in the draft report. Since the AFB, the District held a meeting with EPA, and they concurred that a buyout was the most reasonable solution to the flooding problem in Timber Creek and indicated that as long as relocation assistance was offered and that we conducted public outreach, then they did not predict any issues with the buyout alternatives in Timber Creek.

REQUIRED ACTION: The draft report will document (one to two pages) the District's efforts in public outreach to include the subject of Environmental Justice.

ACTION: Additional information was added in a "Socioeconomics" section in Chapter 2, beginning on page 2-16, regarding existence of low income populations. Additional information was added in Chapter 5, beginning on page 5-33.

HQ ANALYSIS: Resolved

58) Enclosure 2 of transmittal memorandum, significance.

COMMENT: The last paragraph on page 3 of this enclosure states that the willingness of citizens to pay more for houses adjacent to a riparian zone is a factor of technical significance. HQUSACE recommends that this statement be deleted, because it represents a human-assigned value, and is not consistent with the definition of technical significance found on pages E-160 to E-162 of Appendix E, ER 1105-2-100.

RESPONSE: *This enclosure is part of the FSM documentation finalized in 2003. It would not be appropriate to modify this documentation now. The team will assure that this fact will remain in the context of real estate values, and not environmental considerations.*

AFB DISCUSSION AND ACTION: Comment Resolved. However HQUSACE Policy Staff indicated that this was fine for purposes of project justification and benefit-to-cost ratios, but not for the environmental technical significance. The enclosed Significance Criteria provided in response to comment 2e (1) addresses environmental significance.

ACTION: None required.

HQ ANALYSIS: Resolved

59) Planning objectives, pages 4-1 and 4-2.

COMMENT:

- Item 4. Suggest re-wording or deleting this bullet to remove the emphasis on easing zoning restrictions in the floodplain. Objectives 1 and 2 capture the true purpose of the study, i.e., to investigate ways to reduce risks to property, life, health and welfare by reducing flooding. The purpose of the Corps formulation process is not to ease zoning restrictions; any such easing of zoning restrictions is an incidental affect of reduced flooding conditions, and should not be listed among the objectives.

- Item 6. Recommend replacing the phrase "stable hydraulic regime" with a phrase more in line with the Corps ecosystem restoration mission, such as "naturalistic hydraulic regime." This recommended change is more consistent with Corps ecosystem restoration policy.

- Item 8. Recommend deleting this bullet. The Corps should not formulate plans to benefit a single species, see paragraph 7(f) of EP 1165-2-502. The essence of this bullet could be incorporated into the revised item 6, in that the restoration of a more naturalistic hydraulic regime would benefit important species such as the Barton Springs salamander.

RESPONSE: Item 4. While this may not be a Corps objective, it is an extremely important project objective for the customer. We will reword.

Item 6. Concur in comment- the district will revise item 6.

Item 8. Concur – the district will delete item 8.

REQUIRED ACTION: As per response above.

ACTION: Items 4 and 6 were revised, and item 8 was deleted on pages 4-1 and 4-2, as requested.

HQ ANALYSIS: Resolved

60) National ecosystem restoration (NER) criteria, page 4-5, item 1.

COMMENT: Insert the term "aquatic" before the word "ecosystem" in this sentence to emphasize consistency with Corps' mission areas.

RESPONSE: As an alternative, the District recommends that a clarification of the Corps' current policy be incorporated. ER 1165-2-502 Appendix E (22 Apr 2000) Page E-163 section E-41 "Planning Step 6 – Selection of the Ecosystem Restoration Plan" specifically states that we use criteria to select the National Ecosystem Restoration (NER) Plan not the National Aquatic Ecosystem Restoration Plan.

AFB DISCUSSION: HQ suggested that the District insert "aquatic" prior to "ecosystem" as it supports Mr. Woodley's memo, but is not a critical element.

ACTION: None taken.

HQ ANALYSIS: Resolved

61) Table of Contents

COMMENT: No asterisks appear in the Table of Contents, as stated in the last paragraph on this page.

RESPONSE: A complete, expanded table of contents will be included in the draft report.

REQUIRED ACTION: As per response above.

ACTION: A Table of Contents was added to the draft report, with asterisks inserted as appropriate.

HQ ANALYSIS: Resolved

62) Incremental analysis

COMMENT: The incremental analysis values should be updated in the draft report.

RESPONSE: The subject paragraph also states that the approximations used are sufficiently accurate for use in this analysis, and there is little chance that updated values would alter the outcome. Revision of costs for this analysis would require several weeks of man hours for the entire incremental analysis to be recomputed. The District is confident that the results would remain the same.

REQUIRED ACTION: Incremental analysis will be re-run and that the appropriate changes that will be made in the draft report.

ACTION: Incremental analysis values were updated and an economic summary table was added, which presented first costs, for each combination plan analyzed through incremental analysis.

HQ ANALYSIS: Resolved

63) Recreation survey.

COMMENT: The text indicates that details of the survey design can be found in Appendix I. The documentation provided does not include an Appendix I. The district should either include the appendix or provide additional discussion of the survey in the main section of the draft feasibility report.

RESPONSE: Concur. This will be included in the draft report.

REQUIRED ACTION: The district will either include the details of the survey design in an appendix or provide additional discussion of the survey in the main section of the draft feasibility report.

ACTION: Details of the survey design are included in Appendix F, Recreation, in the draft report.

HQ ANALYSIS: Resolved

64) Alternative recreation plan.

COMMENT: Identification of alternative recreation plans is included in the Problems, Needs and Opportunity Chapter. This should be included in plan formulation or evaluation sections.

RESPONSE: Concur.

REQUIRED ACTION: As per comment and response above.

ACTION: The discussion of recreation plans was removed from Chapter 3.

HQ ANALYSIS: Resolved

D. REVIEW COMMENTS ON THE AUGUST 2006 DRAFT FEASIBILITY REPORT AND EA FOR LOWER COLORADO RIVER BASIN PHASE 1.

Comments on Volume I – Main Report.

65) Average Annual Cost and Benefits(Table M-2).

COMMENT: In order to provide a complete presentation of the economic information that is pertinent to the plan selection, Table M-2 should also include the average annual costs and the average annual benefits.

RESPONSE: The District added both the average annual cost and average annual benefits to Table M2 on page 11 as well as table 4-8 in Volume III-Wharton.

HQ ANALYSIS: Resolved

66) Recommended Plan.

COMMENT: The presentation of the recommended plan on page 14 should describe the project features, including basic dimensions. It should also present the plan's expected accomplishments.

RESPONSE: The District added a more comprehensive description of the project features including basic dimensions and expected accomplishments to the main report on page 14.

HQ ANALYSIS: Resolved

67) Financial Costs.

COMMENT: Another format for displaying the flood damage reduction and recreation economic analysis results should be used. Showing the ecosystem restoration costs in the "*financial costs*" column is misleading and inaccurate. This concern also applies to Tables 5-16 through 5-22 in Volume II. Another format for displaying the flood damage reduction and recreation economic analysis results should be used. Showing the ecosystem restoration costs in the "*financial costs*" column is misleading and inaccurate (Tables M-10, M-11 and M-12).

RESPONSE: The District modified the format of all the tables of both reports. They no longer contain the financial costs column.

HQ ANALYSIS: Resolved

68) Value Engineering.

COMMENT: Value Engineering (VE) is mandated by The Office of Federal Procurement Policy Act, Section 911 of WRDA 1986 and OMB Circular A-131. Paragraph 7d, ER 11-1-321, requires all feasibility reports and equivalent to "*contain a review and approval statement from the PM indicating that required VE action has been completed, as appropriate, for that phase of the project. This statement will indicate that appropriate studies have been performed and that all proposals indicating savings greater than $1,000,000, impacting plan formulation, have been resolved.*" Paragraph D-2b, ER 11-1-321, requires "*Value Management Workshops (VE Studies) to be performed in the planning and design phases*" and

"*At least one VE study will be performed during the feasibility phase of the project, as part of the plan formulation process prior to the selection of final alternatives.*" Although presumably the necessary actions have been completed, the draft feasibility report is silent about VE activities for both the Onion Creek and Wharton projects. What were the results of completed VE workshops or studies and what is the status of any ongoing or planned VE efforts for this project?

RESPONSE: The following discussion was added to both of the reports. "The Project Study Plan (PSP) for the Wharton and Onion Interim Feasibility Studies were amended in September 2003 to carry the study through the Feasibility Phase. On February 5, 2005, ER 11-1-321 was published after the final array of alternatives were developed and evaluated, which requires feasibility reports to undergo a Value Engineering (VE) Study before the final array of alternatives are evaluated. Realizing that the study would be grandfathered since the final array of alternatives had already been evaluated, but practicing good business the District Value Engineering Officer(VEO) accompanied the Project Manager to Austin to meet with the local sponsors on Feb 17, 2005 to discuss and perform a mini value engineering analysis and the need to revise the PSP if appropriate to conduct a VE Study. The VEO led the Team in identification of issues of concern associated with Onion Creek, Williamson, and Wharton Studies. The VEO explained the VE Process and how it is used to resolve issues, clarify expectations, and develop alternatives that best meet the functional requirements of the project. The VEO discussed plans for the expanded VE Study, required by law, planned for the Design Phase of the projects. The study team determined that the mini-analysis would suffice for the Feasibility Study since the final array of alternatives were already evaluated and that a detailed study should be completed early in Preconstruction, Engineering and Design Phase." This was added to page 4-21 of the Onion Creek Report and Page 4-8 of the Wharton Report.

DISCUSSION: The VE "mini-analysis" was inadequate for the planning phase and not in accordance with ER 11-1-321. No studies were grandfathered from the requirements of the ER (note that an EC preceded the ER). The "grandfathering" statements should be removed from the report. HQUSACE does not believe it is not worth jeopardizing the contingent authorization to delay the study until the Value Management Workshops are completed.

ACTIONS: To correct the inadequacy, the District should complete the Value Management workshop(s) as a first step in PED. The workshop(s) should bring Corps, sponsor, and possibly other stakeholders together to address any outstanding concerns.

HQ ANALYSIS: Resolved

69) Schedule of Expenditures.

COMMENT: The report is missing the schedule of Federal and Non-Federal expenditures (see paragraph D-5e(1), ER 1105-2-100) for the projects in Volumes II and III.

RESPONSE: Budgeting and funding for the Lower Colorado River Phase I Projects is expected to occur as one, coordinated effort. As such, an implementation schedule, Table M-14 on page 25, and schedule of expenditures, Table M-15 on page 26, has been included in the main report. Segregation of funding by project component is also provided in Table M-15. References are made to the main report within both the Onion Creek and Wharton detailed reports.

HQ ANALYSIS: Resolved

Comments on Volume II – Onion Creek.

70) NED Plan Determination.

COMMENT: The NED Plan is the one that most reasonably maximizes the net economic benefits consistent with protecting the Nation's environment (paragraph 2-3b(1), ER 1105-2-100). In order to establish that a particular plan reasonably maximizes net economic benefits, the report needs to demonstrate that smaller scale plans would not provide greater net benefits. Even though planning objectives seek to reduce damages for events with a 1 or 4 percent chance of exceedance, the report must demonstrate that smaller scale plans would not provide greater net benefits. The report needs to either present smaller scale alternatives or explain why smaller scale alternatives are not reasonable.

RESPONSE: Page 4-31 of the draft Report states "The design level for this alternative was selected after careful consideration of lower as well as higher levels. Buyout up to the 10% level was considered as an option. However, this left the area with a non-continuous hop-scotch pattern of properties. Additional properties would have to be acquired for continuity purposes, which would make this design level nearly equal to the 4% design level. Higher levels, 2% and 1% ACE, were briefly investigated, but it became apparent that buyout to the higher levels could not be economically justified, even if the lands were utilized for alternative uses. Thus, it was a straightforward decision to adopt the 4% floodplain as the target design level. If a multipurpose plan could be designed at this level to make a positive contribution to NED, as well as provide additional ecosystem restoration benefits, then it would meet all the requirements for designation as a Federal Supportable Plan." For the justification for smaller scale plans and Page 4-37 of the draft Report states "To optimize a buyout plan typically an array of alternatives are analyzed. At the 10% ACE level for the Onion Creek Forest/Yarrabee Bend area, however, only three single family structures, 12 multi-family and eighteen mobile homes have a first floor elevation below the 10% ACE level. Evacuation of these few structures would do little to resolve the significant flooding problems in the reach, which has 360 structures below the 4% ACE level. Thus, the 4% plan was

considered to be the minimal level to be evaluated. A higher level plan, a 1% level plan, will also be evaluated as requested by the local sponsor that could possibly be implemented as a locally preferred plan. During the time of formulation, the potential for a 2% ACE level plan was investigated using several distinguishing metrics. For example, the additional increment of 213 houses (573 2% ACE minus 360 4% ACE) would cost over $20 million (1.2 annualized) with a return of about $250,000 annually. This would result in an incremental benefit-to-cost ratio of about 0.2 for flood damage reduction only, meaning recreation would have to support 80 percent of the costs for the increment to be favorable. This was not a reasonable expectation and thus a full evaluation of the 2% ACE level plan was omitted." The District can add the discussion to another section if desired.

HQ ANALYSIS: Resolved

71) Ecosystem Restoration Costs.

COMMENT: The presentation of the recommended plan in Section 5 should also present the cost per acre of the ecosystem restoration measures for each reach since higher authorities may use the numbers in determining acceptability and budget priority. The cost of restoration appears to range as high as $105,000 per acre (Williamson Creek in Tables 5-5 and 5-29), which is excessive compared to other projects nationwide. Also, the cost of land acquisition itself appears to be $93,000 per acre, which also appears excessive. This may affect support by higher authorities.

RESPONSE: The District added the cost per acre to the Economic Summary of the Ecosystem Restoration Table 5-23 on page 5-43. The District recognizes the high cost per unit of restoration and this has caused the District to defer recommendation of the Williamson Creek Portion of the plan until a later date.

HQ ANALYSIS: Resolved

72) Ecosystem Restoration Land Requirements.

COMMENT: As noted in the checklist accompanying the draft report (item K), land acquisition costs for the for ecosystem restoration components exceeds the 25 percent limit prescribed in policy. Land acquisition costs constitute 88 percent of the total cost of the Williamson Creek component, 51 percent for the Onion Creek Forest/Yarrabee Bend Segment component, and 31 percent for the Timber Creek component. The report does not disclose the land acquisition costs for the Bear/Onion Confluence component even though it involves about 12.8 acres of land acquisition (page 4-48). Paragraph 3-5.b.(5) of ER 1105-2-100 states that "*land acquisition in ecosystem restoration plans must be kept to a minimum. Project proposals that consist primarily of land acquisition are not appropriate.*" Paragraph 6.b of ER 1165-2-501 states, "*Proposals that consist primarily of land acquisition are not appropriate as Civil Works ecosystem restoration investments.*"

Paragraph 7.m of EP 1165-2-502 states, "*As a general rule, land value should not exceed 25 percent of total project costs. Projects with land costs exceeding 50 percent of total project costs are not likely to be given a high priority.*" The Director of Civil Works is currently considering a policy determination for another project. HQUSACE staff recommended that the Sponsor should receive credit for the value of LERRD up to 35% of total project costs assigned to ecosystem restoration but that it should not receive reimbursement for the value of LERRD that exceeds its 35 percent cost share. The Director's decision will probably be applied to all other projects, including this project. The land acquisition costs should be presented for the Bear/Onion Confluence component.

RESPONSE: The District has deferred recommendation of Williamson Creek, recognizing the high cost per unit of restoration in Williamson Creek. Adding land acquisition cost for Bear/Onion Confluence would be useless information since it was removed from the Recommended Plan in Chapter 5.

HQ ANALYSIS: Resolved

73) NED Plan Exception.

COMMENT: Pages 4-64 and 5-1 indicate that the recommended Locally Preferred Plan (LPP) would cost more than the NED/NER Plan. In accordance with paragraphs 2-3f(4) and E-3b(1), ER 1105-2-100, the ASA(CW) must grant an exception before the report can recommend the LPP.

RESPONSE: The entire LPP discussion was removed from the report after subsequent discussions with HQ that the LPP was in fact the Recommended Plan with different cost sharing requirements.

HQ ANALYSIS: Resolved

74) Project Life.

COMMENT: Page 4-2 refers to a "*project life*" and Page 4-3 twice uses "*life of the project.*" This word usage implies the project would be temporary, something the Corps normally would not implement or give a high budget priority. The project life is indefinite would end only when Congress deauthorizes the project. When referring to the length of time between construction and replacement or rehabilitation, "*service life*" is more appropriate. Use "*period of analysis*" when referring to the time duration used in evaluating and comparing alternatives (see paragraph 2-4j, ER 1105-2-100).

RESPONSE: Concur, the District changed the wording on page 4-2 and 4-3 as suggested above. We also did a find/replace in all 8 chapters and did not find another occurrence.

HQ ANALYSIS: Resolved

75) Implementation Schedule.

COMMENT: The report is missing an implementation schedule for the recommended plan (see paragraph E-5a, ER 1105-2-100).

RESPONSE: An implementation schedule was added to Volume I, see response above in the main report.

HQ ANALYSIS: Resolved

76) Habitat outputs of the recommended ecosystem restoration features.

COMMENT: Detailed habitat-based analysis has been conducted for the various animal species that would benefit from the proposed restoration of the riparian areas throughout the study area. These riparian zones are called "Terrestrial Resources" throughout the Onion Creek report, and the focus of the habitat analysis is on animals not strongly associated with wetlands or other aquatic habitats, such as fox squirrels, barred owls and raccoons. Conversely, only brief qualitative summaries are used to characterize the benefits to animals of the "Aquatic Resources" in the study area, including smallmouth bass, largemouth bass, sunfish, minnows and frogs. HQUSACE believes that the justification of the ecosystem could be strengthened by including habitat analyses or other information discussing how the proposed riparian restoration would benefit aquatic habitats and species. The issue raised in this comment stems from the very strong emphasis placed on the restoration of aquatic ecosystems in the 29 July 2005 memorandum from ASA(CW) John Paul Woodley, and the equally strong statement that terrestrial restoration should play a very limited role in Corps projects. Clarifying how the riparian restoration directly and indirectly benefits the animals closely associated with the streams in the project area would help support the proposal, and reduce the possible perception that the riparian zone provides largely terrestrial habitat outputs.

RESPONSE: Concur, the District added a discussion about the benefits of the proposed restoration in the final report in the Aquatic Resource Section starting on page 5-15. In addition, the Terrestrial Resource Section was renamed Riparian Vegetation on page 5-16 to more accurately reflect what is being discussed. All habitats within the study area are riparian vegetation rather than upland Terrestrial Habitat as indicated.

HQ ANALYSIS: Resolved

77) Fish and Wildlife Coordination Report.

COMMENT: The draft feasibility study does not include a Fish and Wildlife Coordination report, although a Planning Aid Letter from USFWS dated October

11, 2002 and another letter dated May 22, 2006 are included. The final feasibility report should include a final Fish and Wildlife Coordination Act report.

RESPONSE: The District forwarded the draft FWCAR to HQ for Onion Creek, and the final report is included in Appendix D.

HQ ANALYSIS: Resolved

78) CE/ICA.

COMMENT: The CE/ICA for the ecosystem restoration components for Timber Creek, Onion/Yarrabee and Williamson Creek damage area should be updated to use the current estimated land costs instead of the $7500 per acre cost that was used in the existing CE/IC analysis. This updating of the CE/ICA is especially important given the unanticipated high land costs of the Williamson Creek component. While the updated land cost would apply equally to all alternatives within each action area and may not affect the selection process within the action areas, the CE/ICA for all action areas should be conducted in accordance with Section E-36 of ER 1105-2-100. The OASA(CW) reviewers will certainly request an updated CE/ICA if one is not included in the final report. In addition, the revised CE/ICA should include all appropriate costs, including O & M and other costs, and should not be limited to construction costs and land costs as presented in the draft report

RESPONSE: The Incremental Analysis was updated in the Recommended Plan Section of the Appendix B starting on page B-58. Williamson Creek was deferred from recommendation, so the incremental analysis is only for Timber Creek and Onion Creek Forest/Yarrabee Bend.

HQ ANALYSIS: Resolved

79) Justification for Williamson Creek selected alternative.

COMMENT: The justification for including the Williamson Creek ecosystem component should be strengthened, given that Williamson Creek provides similar habitat outputs as the Timber Creek and Onion Creek/Yarrabee Bend components, but has unit costs that are 3 to 5 time greater based on a comparison of AAC/AAHU (Williamson Creek costs about $16K AAC/AAHU; Onion about $5K AAC/AAHU; Timber Creek about $3.6 K AAC/AAHU). When compared on a cost per acre basis, the Williamson Creek component is approximately 5 times the cost of the Timber Creek and Onion/Yarrabee components (Williamson Creek is about $105K per acre; Timber Creek is about $20K per acre; Onion/Yarrabee is about $22K per acre.) It is very likely that the OASA(CW) reviewers will question whether the investment in the Williamson Creek ecosystem restoration component is justified given the relatively high costs of $105K per acre.

RESPONSE: Williamson Creek was deferred from recommendation.

HQ ANALYSIS: Resolved

80) Study Objectives/Ecosystem Restoration Opportunities.

COMMENT: HQUSACE asks that the last bullet on page 6 Summary Report and page 3-27 Main Report be revised or deleted. The bullet in question reads "Protect existing water quality in the Onion and Williamson Creek watershed by purchasing open space and preventing development." The prevention of development is not an appropriate factor for consideration under the Corps planning process, although it may be appropriate for consideration by local units of government or other parties. If this statement is retained in the report, HQUSACE recommends that it be made clear that this opportunity is solely for consideration by others, and is not part of the formulation process for the NER plan. Secondly, the statement appears to be contrary to the first sentence of paragraph 7(m) of ER 1165-2-100, that states "Proposals that consist primarily of land acquisition are not appropriate as Civil Works ecosystem restoration investments." Purchasing land to acquire open space and prevent development are not consistent with the Corps ecosystem mission, which focuses on using Corps expertise to improve the environment. Taking active measures to improve the environment is appropriate, but mere preservation of existing resources is not.

RESPONSE: The District removed this objective from both of the Reports.

HQ ANALYSIS: Resolved

81) Adaptive Management.

COMMENT: Many ecosystem restoration projects utilize adaptive management, but the Onion Creek report does not include adaptive mgmt. If adaptive management is ever to be considered, it needs to be identified and authorized with the rest of the project in the Feasibility report plus there are additional items of local cooperation that would need to be included. If adaptive management will not be considered then the report should clearly state that adaptive management is not proposed for Onion Cr.

RESPONSE: Discussion on the recommended adaptive management requirements was added to page 27 of the main report and Chapter 5 on page 5-44 of Volume II and page 5-26 of Volume III. Costs associated with it were added to the total project cost. The cost is less than the 3%of the total project cost limit (3% of the total ecosystem restoration or mitigation cost).

HQ ANALYSIS: Resolved

82) Items of Local Cooperation.

COMMENT: The items of local cooperation states "Provide, during construction, 100 percent of the total recreation costs that exceed an amount equal to 10 percent of the sum of the Federal share of total structural flood damage reduction costs, the Federal share of total non-structural flood damage reduction costs, and the Federal share of total ecosystem restoration costs".

However, according to ER 1105-2-100, Section 3-7b.(4) (p. 3-29): "Nonstructural flood damage reduction projects are justified mainly by creating new uses for floodplains, and one of the most important new uses is recreation. The limitation of increased Federal cost for recreation development, described in paragraph 3-7b(2), does not apply to projects formulated for nonstructural flood damage reduction that include recreation development. Cost of recreation development may not exceed one-half of the total project costs." (Note: the limitation in paragraph 3-7b(2) is the ten percent rule).

Since some of the separable elements analyzed by the Onion Creek report relate to non-structural flood damage reduction, would we want to modify item e. to incorporate the 50 percent rule for such features? The language could read as follows:

"Provide, during construction, 100 percent of the total recreation costs that exceed an amount equal to 10 percent of the sum of the Federal share of total structural flood damage reduction costs and the Federal share of total ecosystem restoration costs; or 100 percent of the total recreation costs that exceed an amount equal to the sum of 50 percent of the Federal share of total non-structural flood damage reduction costs and 10 percent of the Federal share of total ecosystem restoration costs; depending on the nature of the flood damage reduction features in the particular sub-plan." [I would normally say "separable element" but the Timber Creek, Onion Creek Forrest/Yarrabee Bend, and Williamson Creek features are called "plans" in the report].

RESPONSE: The District incorporated the above wording on page 5-54 of the report.

HQ ANALYSIS: Resolved

New Comments on Volume III – Wharton.

83) Past Floods.

COMMENT: Pages 3-1 and 3-3 should present the estimated flood damages for the 1998 and 2004 flood events. These numbers would help establish the reasonableness of the expected damages for the without-project condition.

RESPONSE: The District added the estimated flood damages on page 3-2. Since this was flooding related to the main stem Colorado River, the river reaches and

Caney Creek were primarily impacted. The damage estimate for the 1998 event is approximately $6 million, but it may not have been a comprehensive total.

HQ ANALYSIS: Resolved

84) Residual Damages.

COMMENT: The residual damages should be displayed in the main report for all six of the selected plan components. Residual damages can impact plan formulation and selection and must be shown to identify the NED plan.

RESPONSE: The District added a residual damage table, Table 4-10 on page 4-40.

HQ ANALYSIS: Resolved

85) PED Cost Apportionment (Table 5-14).

COMMENT: The line item for PED should be revised to show the PED costs as shared 65/35 since these costs will be addressed separately in the design agreement. The design agreement will not use the cost sharing shown in Table 5-14. It will use 75/35 with the remainder to be recouped during construction.

RESPONSE: After thorough coordination with the vertical team, it was agreed that PED costs are not necessarily cost shared at 65/35, but is really a function of design costs associated with Federal Construction versus design costs associated with relocations, a non-Federal responsibility. The non-Federal design costs may actually be viewed as part of LERRD's. The cost share remains as originally shown. It should be noted that in this instance, the bottom line cost sharing remains the same, regardless of which method is used.

HQ ANALYSIS: Resolved

86) Interior Drainage Sumps.

COMMENT: The sumps should have been developed and analyzed as part of the plan formulation process. They are a significant part of the recommended plan. That being said the district must show that inclusion of this interior drainage solution does not change the plan formulation or selection of the recommended plan. Could Caney Creek be developed to provide the interior drainage to minimize the sumps. We also need to see the costs for each sump including the placing the excess material. What is the total cost of the land, excavation, transportation and placement of excess material, including the cost of temporary storage.

Additionally, in order for this solution to become part of the recommended plan it must be at a feasibility level of design. You must identify a complete plan for the

1.1 million cubic yards of material including a placement site, identify acquisition cost for the placement site and transportation and handling costs.

Finally, the most cost effective sizing of the sumps needs to be determined. If the sponsor requires interior drainage facilities with a greater capacity then any increase in cost is at the full expense of the local sponsor.

RESPONSE: Additional in-depth discussion regarding the sumps placement, formulation, and design has been added on page 5-7 through 5-9 of the report.

HQ Assessment: The additional discussion is not sufficient to determine if the sumps are designed to satisfy EM 1110-2-1413. Interior drainage facilities for Wharton appear to be sized to the 100-year event. This simplified approach is not acceptable except in instances where the existing interior storm drainage facilities are currently at such a standard.

The district needs to determine Minimum Facilities (MF) for all nine interior drainage sump areas. Costs of the MF and the current recommended interior drainage facilities shall be provided in MCACES – costs must include excavation, pumps, gates, real estate, E&D, contingencies, etc. Prepare table that shows full costs of interior facilities. Changes to sump sizes may also alter the environmental impacts and mitigation of the project and will need to be assessed.

Report Modification Options:
a. Modify report to provide only MF for interior drainage.

b. Leave facilities as recommended in report, but show increment greater than MF as 100% non-Federal cost and get letter from sponsor indicating they agree to pay 100% of that increment over MF.

c. If recommended facilities are close in scale and cost to MF, but slightly larger, identify other compelling reasons why the recommended facilities should be kept, such as they are needed for borrow, or mitigation.

Further economic evaluation of increments greater than MF in advance of Chiefs Report, or in PED should be accomplished to determine if any increment between the MF and the recommended plan is economically justified. Any increments that are incrementally justified would be cost shared as a project feature.

All work above needs certified ITR by interior drainage technical experts.

RESPONSE: In response, District staff has completed a determination of minimum facilities for the nine sumps. EM 1110-2-1413 was followed where applicable. The additional analysis has been documented and will be added to Volume III, Appendix G as an addendum. In general, the appurtenances are larger for the minimum facilities, but the amount of excavation is less, resulting in a less

expensive, but much less reliable design. The analysis has been reviewed and certified by qualified experts from the St. Louis District. Costs for the minimum facilities were then compared to the costs of the Recommended Plan. A letter has been provided from the sponsor, indicating their willingness to pay the full amount of the difference in cost. As suggested, further evaluation during the PED will be accomplished to determine if any increment between the minimum facilities and the Recommended Plan is economically justified. In addition, Value Engineering and other more detailed design efforts may result in changes to the Recommended Plan.

An addendum to Appendix G is provided, which documents the additional determination of minimum facilities. Certification of the ITR is also provided, along with revised pages 21 and 24 of the main report, and pages 5-46, 5-47, and 8-2 of Volume III (Wharton).

HQ ANALYSIS: Resolved, with more detailed analysis to be performed in PED.

87) Environmental Setting. Prime and Unique Farmlands.

COMMENT: Paragraph on page 2-10 should include a statement that Prime Farmland does exist in the project area.

RESPONSE: Concur, the District added a statement that approximately 13,000 acres of Prime Farmlands exists in Chapter 2 on page 2-10.

HQ ANALYSIS: Resolved

88) Environmental Impacts of Interior Drainage Facilities.

COMMENT: The report states that "Placement of the sumps was done to cause minimal disruption to humanity as well as the environment. Efforts were taken to minimize the impacts to bottomland hardwoods." The inclusion of several sumps is new in this report. HQ has a few comments on the above statement. First comment: the term "disruption to humanity" is odd. Please explain or use more appropriate terminology, such as "cause adverse impacts to human and natural environments." Second comment: there is no substantiation that efforts were made to reduce impacts to natural resources, particularly bottomland hardwoods. Page 5-10 states that the levee was pulled back from the river bank to avoid impacts to riparian habitat, but there is no discussion of how the sumps were designed to avoid resource impacts. The sump areas increased impacts to forested habitats from 23.2 acres to 64.9 acres without any explanation of how the size and location of these features were determined and how impacts to natural resources were considered. This information needs to be provided in the final report. Impacts to wetlands, grasslands, and residential areas also increased and, although the impacts were not as adverse as for forested habitats, similar discussion of these impacts needs to be provided.

RESPONSE: Concur, the District added discussions on how the sumps locations were determined to reduce impacts and discussed the unavoidable impacts on page 5-7 of the report. The term "disruption to humanity" was also removed when the new language replaced the old language.

HQ ANALYSIS: Resolved

89) Air Quality.

COMMENT: The report states "in the long term there will likely be a beneficial affect to air quality, due to forested areas being replaced by a greater amount than what was lost." This statement is not substantiated and should be removed unless the basis for this determination is provided. Additionally, the project should not result in any significant increase in the amount of forested areas, if mitigation is based upon a habitat analysis. Restoration is not part of the project.

RESPONSE: Concur, the District removed this statement and expanded the impact analysis.

HQ ANALYSIS: Resolved

90) Project Feature Impacts.

COMMENT: The report indicates that about 1,102,000 cy of excess material will need to be stockpiled. Approximately 68 acres of land will be needed to stockpile this excess material at a height of 10 feet and about 171 acres will needed to stockpile at a height of 4-feet. It does not appear that Table 5-4 includes these impacts. Are the stockpiles permanent disposal areas? If so, they should be called such. If not, temporary stockpiles and permanent disposal areas both need to be clearly identified. The cost, location, and environmental impacts concerning the disposal areas need to be discussed in the report in the same detail as other project features, even if the proposal is to locate the disposal areas in open fields (does this pertain to temporary areas, permanent, or both?). How does this affect compliance with the Farmland Protection Policy Act – are disposal areas being evaluated for impacts to Prime Farmlands?

RESPONSE: The Impacts table was revised to show 299.6 acres of impacts to grasslands. A disposal areas discussion was added to the text on page 5-13 describing how disposal areas would be located. An analysis of the total amount of disposal areas available within the general is also included in this section. The disposal areas would not affect Prime Farmlands because the areas could be covered in grass and grazed. This has been coordinated with USDA/NRCS and is described in the Prime Farmland header on page 5-9.

HQ ANALYSIS: Resolved

91) Recommendations.

COMMENT: There are no recreation or ecosystem restoration measures identified in the plan so they should not be recommended.

RESPONSE: Concur, the District removed the recommendation.

HQ ANALYSIS: Resolved

92) Incremental Cost Analysis.

COMMENT: The recommended mitigation sites appear to be appropriate and cost effective. However, the report does not present a standard incremental cost analysis for the proposed mitigation measures to be undertaken at the respective mitigation areas (i.e., an analysis of the costs of various methods of producing the desired environmental outputs). For example, the incremental cost analysis for the creation of a forested habitat might evaluate the relative costs of using bare root saplings, small containerized trees, or balled and burlaped trees, taking into account factors such as plant materials costs, planting density, maintenance requirements, and performance/time needed to achieve the desired habitat outputs. Similar analysis of mitigation methods could be performed for the bottomland forest and herbaceous wetland mitigation needs. Guidance on incremental analysis is found in paragraph C-3 (e) 8, page C-17 of ER 1105-2-100 and in the publications of the Institute for Water Resources.

RESPONSE: Concur, the District added an Incremental Cost Analysis to Appendix B starting on page B-28.

HQ ANALYSIS: Resolved

93) Items of Local Cooperation.

COMMENT: There does not appear to be a listing of items of local cooperation as there is for Onion Creek in Volume II. The closest material I could find is a rather cursory summary on pages 5-39 to 5-40 in Volume III. The District should insert a comprehensive list of items of local cooperation for Wharton as it did for Onion Creek (pages 5-54 to 5-58 of Volume II), tailored of course to the sole purpose of the Wharton project, structural flood damage reduction. This is important, as it supports the list in the Chief's Report, and may serve to obviate misunderstandings as to relative responsibilities down the road.

RESPONSE: Concur, the District added the Items of Local Cooperation provided by HQ starting on page 5-41 of Volume III.

HQ ANALYSIS: Resolved

94) Utility Relocations.

COMMENTS: The REP states that relocations of facilities and utilities have not been developed to a high degree. In order facilitate consideration of combining the Wharton project with the Onion Creek project, the district should identify facilities and utilities to be relocated as a result of the Wharton project, the cost of such relocations, and provide an Attorney's Preliminary Report of Compensability.

RESPONSE: An Attorney's Preliminary Report of Compensability is drafted. The REP was modified to include additional wording on the matter. Costs of relocations are included in the MCACES.

HQ ANALYSIS: Resolved

E. REVIEW COMMENTS ON THE OCTOBER 2006 FINAL FEASIBILITY REPORT AND EA FOR LOWER COLORADO RIVER BASIN PHASE 1.

Comments on Volume II Onion Creek

95) FEMA –HMGP Project.

COMMENT: HQ Review recently discovered that a portion of the Yarrabee Bend has been approved for a FEMA-HMGP voluntary buy-out. Up to about $8M and 118 homes by June 08. The presence of the FEMA program could affect project costs, benefits, and recreation development, which could impact the identification of the NED plan. The district should provide a sensitivity analysis that demonstrates that the FEMA project would not effect the selection of the NED alternative nor its justification. The report should state whether or not Travis County or any other local entities have already or intends to in the future submit any additional buy-out grant requests to FEMA. It should also state the status of any other ongoing or pending actions by FEMA in the study area.

RESPONSE: Prior to the 26 October 2006 Civil Works Review Board, the District conducted the requested sensitivity analysis. Two possible scenarios were evaluated, using the pertinent data associated with the approved HMGP buyout. One scenario assumed buyout of the 40 lowest lying structures, which totaled a first cost of approximately $3.2 million. A second scenario assumed buyout of 62 structures, which would approximate the maximum approved buyout under the HMGP program. The summary results are provided in the following tables. For both scenarios, the costs exceeded the benefits, meaning that the BCR and net benefits for the Corps project would actually increase as a result of the HMGP implementation.

Scenario 1 – Buyout of 40 lowest structures

Description	*Amount*
Investment Cost reduced	$3,238,400
Annualized Cost Reduction	$180,000
Annual Benefits Reduction	$108,300
Net Benefits-all structures	$1,634,000
Net Benetis-with 40 removed	$1,705,700
BCR - all structures	1.46
BCR - with 40 removed	1.51

Scenario 2 – Buyout of 62 structures (maximum cost)

Description	*Amount*
Investment Cost reduced	$8,019,700
Annualized Cost Reduction	$447,000
Annual Benefits Reduction	$339,000
Net Benefits-all structures	$1,634,000
Net Benetis-62 removed	$1,742,000
BCR - all structures	1.46
BCR - 62 removed	1.57

A revision to the report was coordinated with HQ on 19 October 2006, and was included in the version of the Final Report that was sent to the State and Agencies. As such, there is no need for official revised pages. The 12 copies of the Final report that were provided to HQ on 11 October 2006 must, however, be updated to the S&A version. The affected pages in Volume II, are pages 6-1 through 6-4. These are provided, and are marked as revised.

HQ ANALYSIS: Resolved

96) Recreation Facilities on FEMA/Locally Owned Lands.

COMMENT: Both Timber Creek and Yarrabee Bend project elements include recreation facilities on lands that are already owned by sponsor and/or lands that may be acquired by sponsor through FEMA-HMGP project, thus these lands are not required by Corps for non-recreation purposes. Corps policy limits Federal cost-sharing for recreation to facilities developed on lands acquired for non-recreation purposes except for access and parking [Ref: ER 1105-2-100, para. 3-7b]. The district needs to coordinate with FEMA or the Texas Emergency Management Agency for agreement on the scope of recreation facilities on lands acquired thru HMGP and obtain a letter of support. In addition, the district should prepare an

exception request for submittal through HQ to OASA(CW) to attain approval for Corps cost-sharing in recreation facilities on sponsor current and future owned lands as part of an overall collaborative Federal and non-Federal effort. If approval is not attained, then the district should make adjustments in recreation facilities or make cost sharing changes during PED.

RESPONSE: As directed, the District, in conjunction with the City of Austin, coordinated with the Texas Division of Emergency Management regarding the proposed recreation facilities on lands acquired through the HMGP. A letter of support dated 17 November 2006 was provided by the state agency, who is the administrator of the program and will be added to the report correspondence. In addition, the District prepared an exception request, which was provided to HQ on 22 November 2006. The request has been forwarded to OASA(CW) to attain approval for Corps cost-sharing in recreation facilities on sponsor current and future owned lands as part of an overall collaborative Federal and non-Federal effort. OASA(CW) staff has verbally expressed their support of the exception. However, if approval is not attained, then the district will make adjustments in recreation facilities or make cost sharing changes during PED.

Revised pages are provided for the Main Report, and Volume II, Chapter 6.

HQ ANALYSIS: Resolved

97) Section 104 Credits

COMMENT: Discussions with the district indicated that the sponsor has requested and received ASA approval for credit under the authority of Section 104 of WRDA 1986. The feasibility report will need to describe the credit request, the status of the advance work, plans for completing any remaining advance work, and the procedures and criteria for awarding credit. The cost-share display(s) should also indicate the cash and LERRD credits. The final feasibility report will also need to specifically address the usefulness of the non-Federal work for flood damage reduction and the degree it is integral to the proposed Federal project, environmentally acceptable, and economically justified.

RESPONSE: Discussions of the Section 104 credit was included in Volume II, page 9-2. It included the approval date, a maximum credit amount of $3,500,000, and that it is for advanced buyout. No additional information is known at this time. A copy of page 9-2 with a 'revised' marking is provided.

HQ ANALYSIS: Resolved